Connection blocks type A

For direct mounting on to compact hydraulic power packs

Type FP	**acc. to D 7310**
Type HC, HCW, HCG	**acc. to D 7900 H**
Type MP, MPW	**acc. to D 7200**
Type HK, HKF, HKL	**acc. to D 7600 H**
Type KA	**acc. to D 8010**
Type MPN	**acc. to D 7207**

Additional connection blocks

Type AX	featuring a safety valve with unit approval (TÜV/CE)	see D 6905 TÜV
Type B	for single acting consumers	see D 6905 B
Type C	for direct pipe connection	see D 6905 C

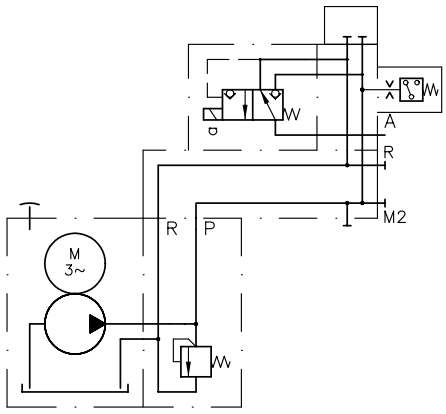
1. General

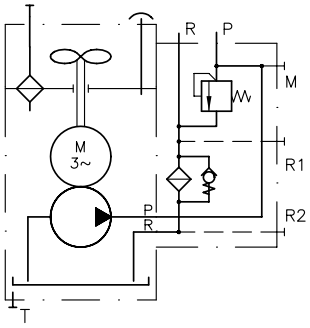
The compact hydraulic power packs (acc. to above pamphlets) form only basic units, that have to be completed by directly mountable connection blocks prior to use. They enable either direct connection to the pipe work via industrial standard fittings or direct mounting of valve banks.

The following basic versions are available:

- For single circuit pumps (sect. 2.1, page 2++)
  - with pressure limiting valve (tool adjustable, maually adjustable or proportional)
  - with additional idle circulation valve
  - with switch-off valve for accumulator charging operation
- For dual circuit pumps (sect. 2.2, page 7++)
  - with two stage valve
  - with double switch-off valve
- Intermediate blocks, spacer plates etc. (sect. 2.2.4, page 12; sect. 2.3, page 13; sect. 2.4, page 14)
  - for arbitrarily activated second pressure stage
  - for arbitrary interconnection of two pump circuits etc.

Many options like return filter, check valves for P and R etc. complement the range.





Example: HCW34/0,9-A1/420-BWH1F1-H5-1-1-G24

Example: HK44/1-H5,8-A1F3/320

2. Available versions

2.1 Connection blocks for single circuit pumps

Connection blocks for dual circuit pumps, see sect. 2.2, page 7

Order examples: **HCW34 L/0,9 -A1/700**
HKF449DT/1-Z12,3-AL21F3-E50/60-4/150
MP44-H5,8-U -AS3F3/250-BVZP1F-G55/0-1-1-G 24

Table 1

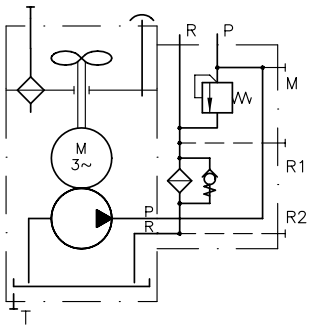
- Compact hydraulic power packs
  - Type HK and HKF acc. to D 7600-2, D 7600-3, D 7600-4
  - Type HKL acc. to D 7600-3L
  - Type HC and HCW acc. to D 7900
  - Type HCG acc. to D 7900 G
  - Type MP and MPW acc. to D 7200
  - Type FP acc. to D 7310
  - Type KA acc. to D 8010
  - Type MPN acc. to D 7207
- Intermediate blocks as transition for dual circuit pumps
  - Type C30, SS, VV..., UNA see sect. 2.2.4
- Spacer plates
  - Type U see sect. 2.4
- Connection blocks for direct pipe connection
  - Type C15, C16, and C36 see sect. 2.5
- Valve banks that can be directly mounted
  - General
    - Type BA acc. to D 7788
  - Directionally seated valves
    - Type VB acc. to D 7302
    - Type BWN and BWH acc. to D 7470 B/1
    - Type BVZP acc. to D 7785 B
  - Directional spool valves
    - Type SWR and SWP acc. to D 7450, D 7451
    - Type SWS acc. to D 7951
- Additional intermediate blocks for second pressure stage, see sect. 2.3

For additional example circuitries, see sect. 5.1

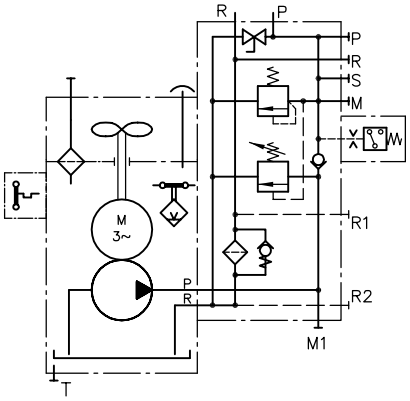
Table 1: Over view

Basic type	Brief description	Examples	Options: Check valve in P	Options: Return pressure stop in R	Options: Return filter / pressure filter	Options: Ports P and R (BSPP)	Max. operating pressure (bar)
A	Basic version, pressure limiting valve tool or manually adjustable, see sect. 2.1.1	A1/700	●	●	● / -	G 1/4 or G 3/8	700
AP	Like basic version but with proportional pressure limiting valve, see sect. 2.1.2	AP34-44 -G 24	●	●	● / -	G 1/4	700
AS AV AK AM	Like basic version but with additional idle circulation valve (either open or blocked in energized state), see sect. 2.1.3	AS2F3/380-WG 230	●	●	● / -	G 1/4	450
AL	Version with switch-off valve e.g. for accumulator charging circuits, see sect. 2.1.4	AL11-C280	●	●	● / ●	G 1/4 or / and G 3/8	350
AX	Version with unit approved safety valve (TÜV/CE) usually used for accumulator charging circuits; For details, see D 6905 TÜV	AX14C/250	●	●	● / -	G 1/4	450

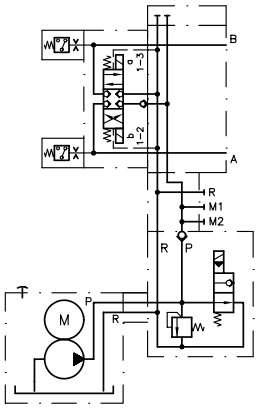
Symbol examples:



HK34/1-H0,9-A1F2/230



HKF449DT/1-Z12,3-AL21F3E50/60-4/150



MP44-H5,8-U-AS3/250-BVZP1F-G55/0-1-1-G24

2.1.1 Basic connection block versions

Order examples:

A51 /500
A3 F1 /315
A2 R /700

Pressure setting / Adjustment range: (0) ... 80 bar, (0) ... 160 bar, (0) ... 315 bar, (0) ... 500 bar, (0) ... 700 bar

The pressure specification determines the respective pressure range i.e. the spring.
Example: A1/240 is covered by pressure range (0)...315 bar

Table 4: Return filter; only available for type A1 ... A4! For further details, see sect. 3.3.

Coding	Without filter	**F0**	**F1**	**F2**	**F3**
Additional clogging control via pressure switch	-	**F0V**	**F1V**	**F2V**	**F3V**
With visual clogging indication (various orientations)	-	**F0G F0G1**	**F1G F1G1**	**F2G F2G1**	**F3G F3G1**
Max. return flow (lpm)	-	7	15	21	33

Table 3: Drain stop only available for type A1...A4 and A14(15)!

This check valve prevents that the power pack type HK acc. to D 7600 ++ or type HC acc. to D 7900 ++ run empty (are drained), while servicing the directly mounted valve bank.
This is not necessary with connection blocks featuring a return filter, since in the filter already comes with a return pressure stop (pre-load approx. 0,15 bar).

Coding	Description
without	Standard, without drain stop
R [1]	With drain stop at R (pre-load approx. 0.1 bar) (order number for refitting 6905 050a)
R1 [1]	With drain stop at R (pre-load approx. 0.9 bar) (order number for refitting 6905 050b)

Table 2: Connection block, p_{max} = 700 bar

Coding Pressure limiting valve: Tool adjustable	Manually adjustable	With lock	Check valve at P	Ports P and R (R1, R2) ISO 228/1 (BSPP)	Max. flow (lpm)	Suited directional valve banks for direct mounting
A1 A3	**A2 A4**	**A2H A4H**	No Yes [1]	G 1/4	18	①②
A13 A33	**A23 A43**	**A23H A43H**	No Yes [1]	G 3/8	18	BWH3F acc. to D 7470 B/1
A51 [2]	**A61** [2]	**A61H**	Yes	G 3/8	18	VB11(21,22)G acc. to D 7302
A14	**A15**	**A15H**	Yes	G 1/4	16	①②

[1] Only in combination with a directly mounted directional valve bank. Not available for direct pipe connection, due to the spatial requirement of fittings for ports P and R)

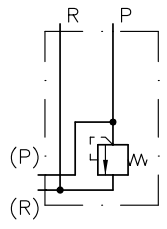
[2] Preferably for direct mounting of compact hydraulic power packs type MP acc. to D 7200.
The spring dome of the pressure limiting valve and the possibly directly mounted valve banks type VB11G and VB21G are directing upwards (in reference to the cover plate of the tank). When used at compact power packs type HC (acc. to D 7900) and HK (acc. to D 7600 ++) they will direct radially.

① Type BA acc. to D 7788
Type BWN1F, BWH1F, BWH2F acc. to D 7470 B/1
Type VB01F, VB11F, VB21(22)F acc. to D 7302
Typ BVZP1F acc. to D 7785 B

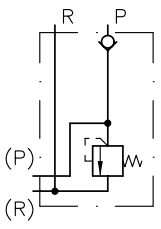
② Type SWR1F, SWP1F acc. to D 7450
Type SWR2F acc. to D 7451
Type SWS2F acc. to D 7951

Symbols

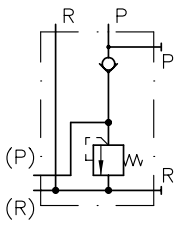
A1



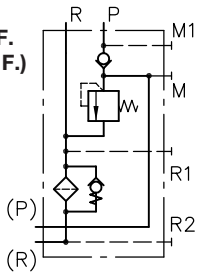
A3



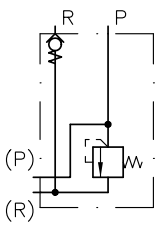
A51



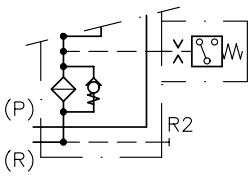
A3F. (A1F.)



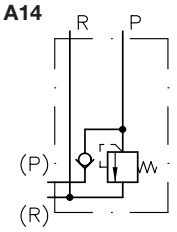
Coding **R**



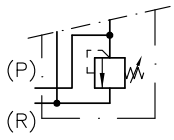
Coding **F.V**



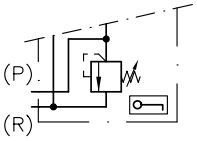
A14



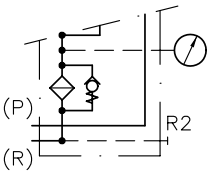
Adjustable pressure limiting valve
A2(4), A23(43), A61, A15



Pressure limiting valve with lock
A2(4)H, A23(43)H, A61H, A15H



Coding **F.G**



2.1.2 Connection blocks with proportional pressure limiting valve

Application: Stepless adjustment of the operating pressure in dependence of the functions to be operated or the time

A prop. amplifier is required for the control of a prop. solenoid. Recommended are: Type EV1M2 acc. to D 7831/1, type EV1G1 acc. to D 7837, or type PLVC acc. to D 7845 ++.

Order example:

AP34 R - 43 - G 24 Version without return filters

AP1 F2 - P4 - 44 /650 - G 12 Version with return filter

AP1 — For drain stop, see table 3 in sect. 2.1.1 [1]

F2 — For return filter, see table 4 in sect. 2.1.1

P4 — Only apparent at versions with return filter

44 — Pressure setting with tool adjustable pressure limiting valve, limiting the max. system pressure (For pressure ranges, see sect. 2.1.1). When a pressure specification is missing in the order coding, the pressure limiting valve will be set approx. 10% higher than the p_{max} rating of the prop. pilot valve (max. 750 bar)

/650 — **Table 6:** Proportional pressure limiting valve

Main valves	Proportional pilot valve			
	-41	**-42**	**-43**	**-44**
	Prop. controllable pressure range (bar) p_{min} ... p_{max} [4]			
4 [2] **-P 4** [3]	5...180	5...290	5...440	5...700
5 [2] **-P45** [3]	5...110	5...180	5...270	5...450
6 [2]	5...80	5...130	5...190	5...320

- G 12 — **Table 7:** Solenoid voltage [5], for details, see sect. 3.2

Coding	**G 12** with plug	**G 24**	**X 12** without plug	**X 24**
Nom. voltage	12V DC	24V DC	12V DC	24V DC

Table 5: Connection block, p_{max} = 700 bar
The prop. pressure limiting valve is open while deenergized i.e. it can be utilized as idle circulation valve like with type AS and AK (see sect. 2.1.3).

Coding	Check valve in P	Ports P and R ISO 228/1 (BSPP)	Max. flow (lpm)	Suited directional valve banks for direct mounting
AP 1	No	G 1/4	18	① ② see sects. 2.1.1
AP 3	Yes [1]			

Utilized prop. pressure limiting valve:

- With type AP14...36 (without return filter) acc. to D 7485/1 — Components from type PMV4(45)
- With type AP1.F.. and AP3.F.. (with return filter) (complete valve) — Type PMVP4(45) acc. to D 7485/1

[1] Only in combination with a directly mounted directional valve bank. Not available for direct pipe connection, due to the spatial requirement of fittings for ports P and R).

[2] Version without return filter

[3] Version with return filter acc. to table 4, sect. 2.1.1

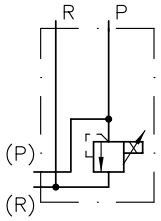
[4] The min. pressure p_{min} of approx. 3 ... 5 bar can be only achieved below (0.1 ... 0.2) Q_{max} (16 lpm). p_{min} is adjusted via the set screw (see sect. 4).

[5] The voltage specification will apply also to the solenoid actuation of a possibly mounted directional valve bank.

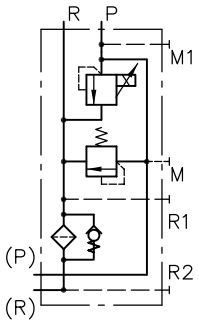
Symbols

Check valve in P

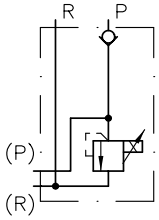
AP1



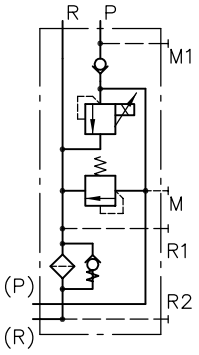
AP1.F.



AP3



AP3.F.



2.1.3 Connection blocks with additional idle circulation valve

Application:
- As start-up aid, enabling depressurized starting of the compact power packs with 1-phase motor e.g. type FPWX acc. to D 7310, type HCW acc. to D 7900, type HKLW acc. to D 7600-3L and MPW acc. to D 7200 ++
- As idle circulation valve with compact power packs type HK(F) acc. to D 7600 ++ and MP acc. to D 7200 ++ for operating modes S1 or S6

Order examples:

AS1R /350 - G 24
AV1 F1 /400 - WG 230

Table 9: Solenoid voltage [3], for details, see sect. 3.2

Standard (incl. plug)	G 12	G 24	G 98	G 205	WG 110	WG 230
Without plug	X 12	X 24	X 98	X 205	---	---
With LED-plug	L 12	L 24	---	---	---	---
Nom. voltage U_N	12V	24V	98V	205V	110V 50/60 Hz	230V 50/60 Hz
	DC-voltage				AC-voltage	
Nom. power P_N	21 W = EM 11, EM 21 acc. to D 7490/1 24.4 W = WH1 acc. to D 7470 A/1					

Pressure setting
(for pressure ranges, see sect. 2.1.1)
Attention: p_{max} acc. to table 8 !

For return filter,
see table 4 in sect. 2.1.1

For drain stop, see table 3 in sect. 2.1.1 [1]

[1]) Only in combination with a directly mounted directional valve bank. Not available for direct pipe connection, due to the spatial requirement of fittings for ports P and R).

[2]) Connection blocks type AK and AM are only available in combination with return filter acc. to table 4.

[3]) The voltage specification will apply also to the solenoid actuation of a possibly mounted directional valve bank.

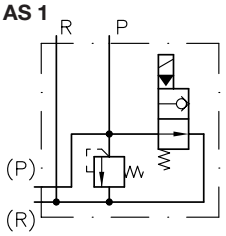
Table 8: Connection block, p_{max} = 450 bar, type AS, AV (version without return filter) as well as type AK and AM
p_{max} = 400 bar, type AS, AV (version with return filter)

Coding Pressure limiting valve: Tool adjustable	Manually adjustable	With lock	Check valve in P	Ports P and R (R1, R2) ISO 228/1 (BSPP)	Max. flow (lpm)	Suited directional valve banks for direct mounting
AS 1	**AS 2**	**AS 2H**	No	G 1/4	18	①② see sect. 2.1.1
AS 3	**AS 4**	**AS 4H**	Yes [1])			
AV 1	**AV 2**	**AV 2H**	No			
AV 3	**AV 4**	**AV 4H**	Yes [1])			
AK 1 [2])	**AK 2** [2])	**AK 2H** [2])	No	G 1/4	8	①② see sect. 2.1.1
AK 3 [2])	**AK 4** [2])	**AK 4H** [2])	Yes [1])			
AM 1 [2])	**AM 2** [2])	**AM 2H** [2])	No			
AM 3 [2])	**AM 4** [2])	**AM 4H** [2])	Yes [1])			

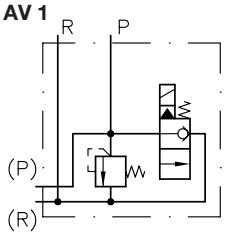
Utilized idle circulation valves:
- With type AS. and AV.: (without return filter) Type EM11S or EM11V acc. to D 7490/1
- With type AS..F.. and AV..F..: (with return filter) Type EM21S and EM21V acc. to D 7490/1
- With type AM..F.. and AK..F..: (with return filter) Type WH1F and WH1D acc. to D 7470 A/1

Symbols

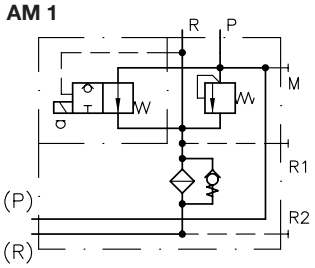
AS 1



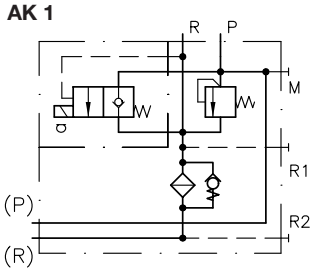
AV 1



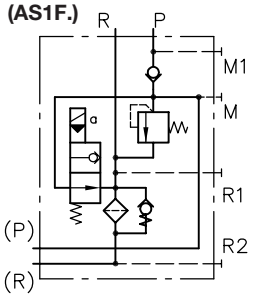
AM 1



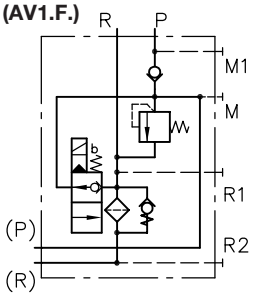
AK 1



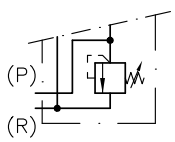
AS3F. (AS1F.)



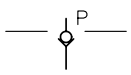
AV3.F. (AV1.F.)



Adjustable pressure limiting valve
AS 2(4), AV 2(4), AK 2(4), AM 2(4)



Check valve in P
AS 3(4), AK 3, AV 3(4), AM 3



2.1.4 Connection blocks with switch-off valve

Application: Preferably for accumulator charging operation

Attention: Type AL21 is only suited for direct mounting onto compact hydraulic power packs type HK(F)4. acc. to D 7600-4, type HK3. acc. to D 7600-3 and type HKL(W)3. acc. to D 7600-3L.

Order examples: **AL11 R-C250**

AL21 F2 -E90/100 -7/80
AL21 D10V -F50/60 -5/40

For drain stop, see table 3 in sect. 2.1.1 [1])

Table 11:
Pressure range and pressure setting of the switch-off valve

Coding	Pressure range (bar)	
	AL11(12)	AL21
C	240...350	160...350
D	130...250	120...220
E	60...140	80...140
F	-	40...80

Table 12: Applies only to type AL21: Pressure switch acc. to D 5440 with specification of the trigger pressure (trigger pressure is omitted with type DG5E)

Coding	Pressure switch	Pressure range (bar)
2	without	Prepared for retrofitting
3	DG 33	200...700
4	DG 34	100...400
5	DG 35	20...250
6	DG 36	4...12
7	DG 365	12...170
8	DG 364	4...50
5E-100	DG 5E-100	0...100
5E-250	DG 5E-250	0...250

Applies only to type AL21: Pressure setting of the tool adjustable pressure limiting valve (For pressure ranges, see sect. 2.1.1)
Attention: p_{max} tab. 10 for idle circulation valve!

Table 10: Connection block

Coding Switch-off valve Tool adjustable	Manually adjustable	Ports P and R ISO 228/1 (BSPP)	Max. recommended flow (lpm)	Suited directional valve banks for direct mounting	Note and p_{max}
AL 11	**AL 12**	G 1/4	12	① see sect. 2.1.1	p_{max} = 350 bar
AL 21 F0. [2]) **F1.** [2]) **F2.** [2]) **F3.** [2])	--	G 1/4 and G 3/8 (S = G 1/2)	18	① see sect. 2.1.1	p_{max} = 350 bar, for return filter and add. elements, see table 4 in sect. 2.1.1
AL 21 D0 [2]) **D10** [2]) **D10V** [2])	--	G 1/4 and G 3/8 (S = G 1/2)	18	① see sect. 2.1.1	p_{max} = 250 bar, pressure resistant filter D0 = Without (prepared for retrofitting) D10 = With filter Filter fineness 10 µm (β_{10} = 75)

V - Clogging indicator (integrated Reed Sensor)
Trigger pressure approx. 2 bar; for details, see sect. 3.3

[1]) Only in combination with a directly mounted directional valve bank. Not available for direct pipe connection, due to the spatial requirement of fittings for ports P and R)

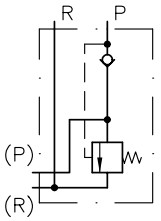
[2]) Only suited for compact power packs type HK(F)4. acc. to D 7600-4, type HK3. acc. to D 7600-3 and type HKL(W)3. acc. to D 7600-3L

Utilized switch-off valves:
- Type AL11(12) Internal functional components are from type LV10 acc. to D 7529
- Type AL21 Internal functional components are from type LV20 acc. to D 7529

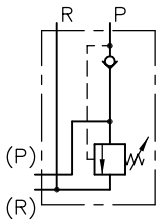
Utilized pressure limiting valve:
- Type CMVX 2 acc. to D 7710 TÜV

Symbols

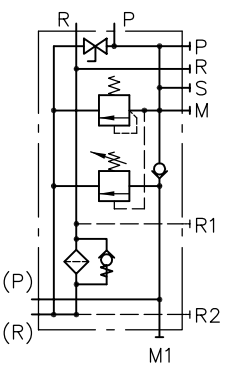
AL11



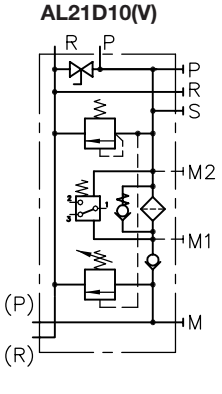
AL12



AL21F



AL21D10(V)



Note:
The valve type AL are mainly intended for circuits featuring hydraulic accumulators as it will automatically switch the pump delivery into idle circulation as soon as the set trigger pressure is achieved. A control piston is moved in the valve during the switching process. The small volume required for this is picked from the accumulator.
In circuits without accumulator, this small volume has to be generated by the fluid elasticity stored in the line from port P to the directional valve. This makes necessary a certain min. volume of this line i.e. a pipe/hose with wide internal diameter should be selected. When such a line is missing, because the directional valves are directly mounted, this small volume can be supplied by a miniature accumulator type AC 13 (acc. to D 7571). The gas filling should be charged to approx. 80 ... 85% of the intended trigger pressure.

2.2 Connection blocks for dual circuit pumps

Order examples:

HKF449DT/1 -ZZ 3,5/11,3 -AN21F1-D40-C200

HC48/HZ 0,9/12,3 -NA31 -B500 /150/170 -X

HKLW34T/1 -HZ0,37/2,7 -NA21 -A700R /100 /100 -GZ4 -1 -G 24

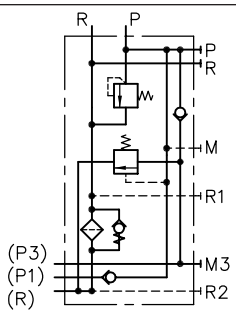
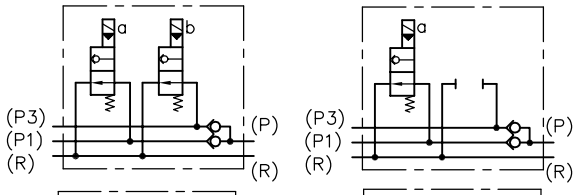
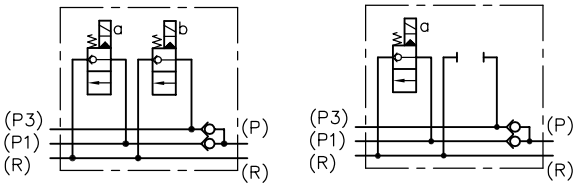
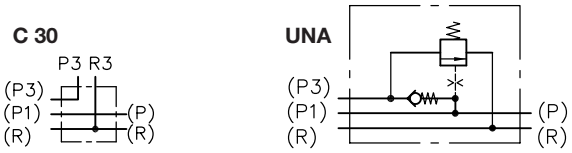
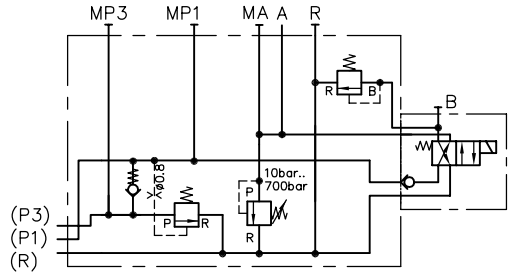
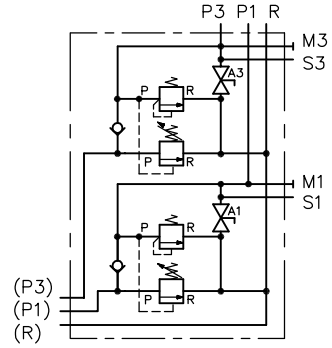
HK44 /1 -HH4,3/6,5 **-SS -A1/200 -WG 230**

- Compact hydraulic power packs
  Type HK and HKF acc. to D 7600-4
  Type HKL and HKLW acc. to D 7600-3L
  Type HC and HCW acc. to D 7900
  Type KA acc. to D 8010
  Type MPN acc. to D 7207
- Spacer plate
  Type U2, U4 see sect. 2.4

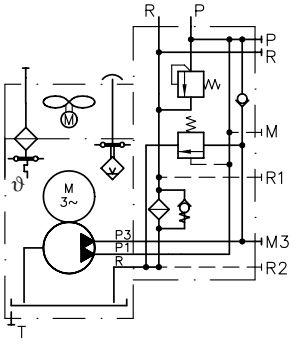
Connection blocks acc. to sect. 2.1

For further example circuits, see sect. 5.2

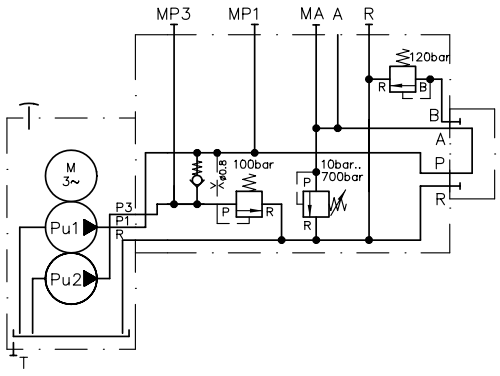
Table 13: Overview

Basic type	Brief description	Symbols (examples)	Return filter	Ports P and R (BSPP)	Max. operating pressure (bar)
AN	Version with two stage valve for high/low pressure systems, with the low pressure circuit being automatically fed back in the tank pressure less, as soon as the set pressure is exceeded (see sect. 2.2.1).		●	G 1/4 and G 3/8	500
SS **VV** **SX** **VX**	Intermediate block for optionally joining the two pump circuits: An additional connection block acc. to sect. 2.1 is required, see sect. 2.2.4		--	--	450
UNA	For intermediate block with shut-off valve, see sect. 2.2.4				
C30	Intermediate block enabling direct connection of pump and return line, see sect. 2.2.4		--	G 1/4 and G 3/8	700
NA	Version like type AN, but with directly mounted 3/2- or 4/2-way directional valve as motion direction control for the connected consumers (see sect. 2.2.3).		●	G 1/4 or G 1/4-18 NPTF	700
AL 221	Version designed as double switch-off valve similar to type AL21 acc. to sect. 2.1.4, see sect. 2.2.2		--	G 3/8	350

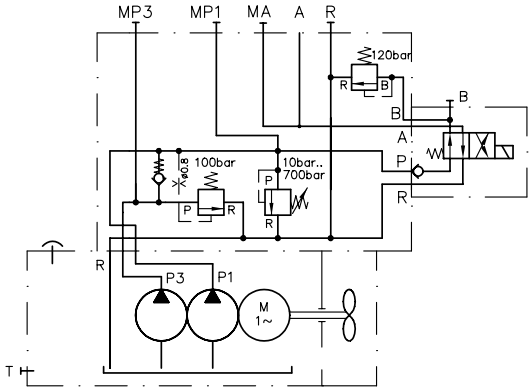
Symbols according to the order examples (page 7)



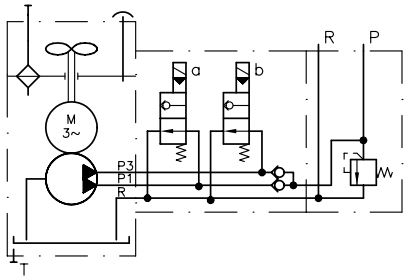
HKF449DT/1-ZZ 3,5/11,3 -AN21F1-D40-C200



HC48/HZ 0,9/12,3 -NA31 -B500 /150/170 -X



HKLW34T/1 -HZ0,37/2,7 -NA21 -A700R /100 /100 -GZ4 -1 -G 24



HK44 /1 -HH4,3/6,5 -SS -A1/200 -WG 230

2.2.1 Connection blocks with two stage valve

Application: High/low pressure systems e.g. for press applications

Order examples: **AN21 F2 -D40 -C200**

AN23R F0 -E25 -B500

For drain stop in R (G 1/4), see table 3 in sect. 2.1.1 [1])

For pressure range and setting of the switch-off valve, see table 14a

Return filter acc. to table 4 in sect. 2.1.1

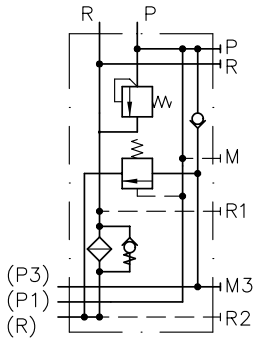
Table 14: Connection block, p_{max} = 500 bar

Coding	Check valve in P (G 1/4)	Ports P and R ISO 228/1 (BSPP)	Max. recommended flow (lpm)	Suited directional valve banks for direct mounting
AN 21	No	G 1/4 and G 3/8	18	① ② see sect. 2.1.1
AN 23	Yes [1])			

Utilized switch-off valve is type CNE21 acc. to D 7710 NE

Symbols

AN21



AN23

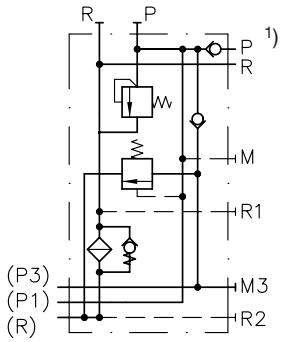


Table 14b: Pressure range and setting of the pressure limiting valve

Coding	Pressure range
B	316 ... 500 bar
C	161 ... 315 bar
E	81 ... 160 bar
F	0 ... 80 bar

The pressure setting of the pressure limiting valve must be at least 5 bar higher than the setting of the switch-off valve to ensure a depressurized idle circulation of pump P3.

Table 14a: Pressure range and setting of the switch-off valve

Coding	Pressure range
L	120 ... 150 bar
M	95 ... 120 bar
A	75 ... 90 bar
B	60 ... 75 bar
C	45 ... 60 bar
D	30 ... 45 bar
E	20 ... 30 bar

[1]) Only in combination with a directly mounted directional valve bank. Not available for direct pipe connection, due to the spatial requirement of fittings for ports P and R)

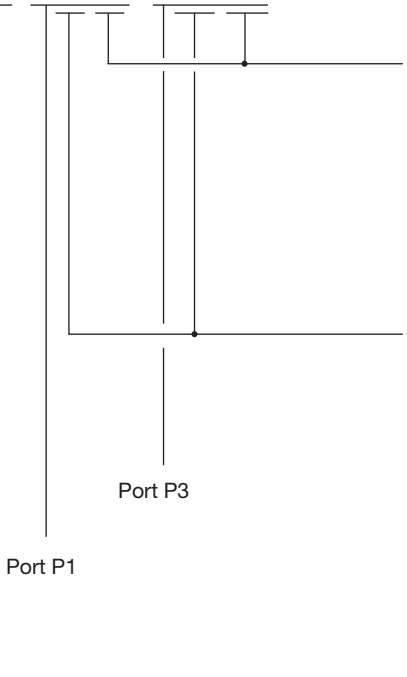
2.2.2 Connection blocks with double switch-off valve

Application: Systems with two separate accumulator charging circuits

Attention: It is not possible to mount directly directional valve banks. When this is required, a dual circuit version of the compact hydraulic power pack type HK(F)4 with two connection pedestals should be selected.

Example: HK449DT/1-Z8,8-Z8,8
- AL11E80 - BVZP1F - G22/0 - 1 - 1
- AL11D140 - BVZP1F - G22/0 - 1 - 1 -G 24

Order examples: **AL221 - F60/80 - D120/150**



Pressure setting of the pressure limiting valves

Utilized is pressure limiting valve
type CMVX acc. to D 7710 TÜV

Pressure ranges:
316 ... 500 bar
161 ... 315 bar
81 ... 160 bar
0 ... 80 bar

Table 15a: Pressure range and setting of the switch-off valves

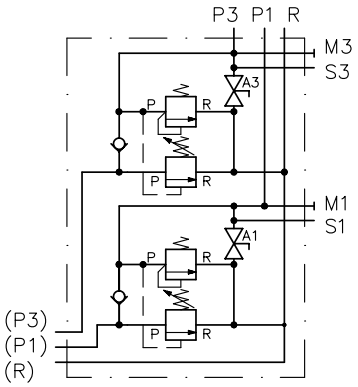
Coding	Pressure range
C	160 ... 350 bar
D	120 ... 220 bar
E	80 ... 140 bar
F	40 ... 80 bar

Table 15: Connection block, p_{max} = 350 bar

Coding	Ports P and R ISO 228/1 (BSPP)	Max. recommended flow (lpm)
AL221	G 3/8	18

Utilized as switch-off valve:
Functional components of type LV20 acc. to D 7529

Symbol



Note:

The valve type AL are mainly intended for circuits featuring hydraulic accumulators as it will automatically switch the pump delivery into idle circulation as soon as the set trigger pressure is achieved. A control piston is moved in the valve during the switching process. The small volume required for this is picked from the accumulator.
In circuits without accumulator, this small volume has to be generated by the fluid elasticity stored in the line from port P to the directional valve. This makes necessary a certain min. volume of this line i.e. a pipe/hose with wide internal diameter should be selected. When such a line is missing, because the directional valves are directly mounted, this small volume can be supplied by a miniature accumulator type AC 13 (acc. to D 7571). The gas filling should be charged to approx. 80 ... 85% of the intended trigger pressure.

2.2.3 Connection blocks with two stage valve

Application: High/low pressure systems for the control of single and double acting consumers e.g. torque wrenches.

Order examples:

NA 31 - A 700 H /100 /120 A - GZ 4 - 1R - G 24
NA 21 NPTF - B 500 R /150 / - WG 3 - 1 - WG 110
NA 21 F1 - A 630 /80 /V100 - GZ 4 - 1R - WG 230

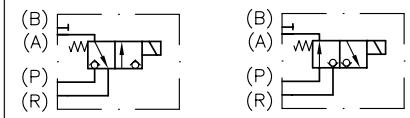
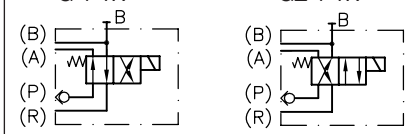
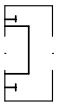
[1] p_{max} = 700 bar
Q_{max} (P1 + P3) = 12 lpm

For return filter see table 4 in sect. 2.1.1 (only with type NA 21 F.)

Table 18: Solenoid voltage (for more details, see D 7300)

Standard (incl. plug)	G 12	G 24	WG 110	WG 230
Without plug	X 12	X 24	---	---
With LED-plug	L 12	L 24	---	---
Nom. voltage U_N (other voltage on request!)	12V	24V	110V 50/60 Hz	230V 50/60 Hz
	DC-voltage		AC-voltage	
Nominal power P_N	20 W			

Table 17: Directly mounted directional seated valve acc. to D 7300 as direction control (for hydraulic, pneumatic or mechanical actuations for this valve, see D 7300)

Coding	Direction control for:	Symbol
G 3-1 **GZ 3-1**	Single acting hydraulic cylinders with spring return (only with type NA 21 without filter)	G 3-1 GZ 3-1 
G 4-1R **GZ 4-1R**	Double acting hydraulic cylinders	G 4-1R GZ 4-1R 
X	No direction control (blanking plate)	

Operating pressure p_B (20...300 bar, 20...530 bar) at port B, setting approx. 20 bar higher than the switch-over valve
Zusatz **A**: only avail. for piston ∅8, definite leckage for unlooding of galley B

Pressure range: 20 ... 70 bar
Piston ∅8 71 ... 150 bar
151 ... 230 bar
231 ... 300 bar
Pressure range: 20 ... 125 bar
Piston ∅5 126 ... 265 bar
266 ... 410 bar
411 ... 530 bar

Table 17a: Idle circulation valve only with type NA21F.. (version with return filter)

Coding	Description
V	deenergized = blocked
S	deenergized = open
X	without valve

Utilized idle circulation valve:
Type EM11S or EM11V acc. to D 7490/1

Pressure setting (10...200 bar, 201...500 bar), of the switch-over valve

Pressure range: 10 ... 100 bar
Piston ∅8 101 ... 150 bar
151 ... 200 bar
Pressure range: 201 ... 255 bar
Piston ∅5 256 ... 385 bar
386 ... 500 bar

Table 16: Connection block [1]

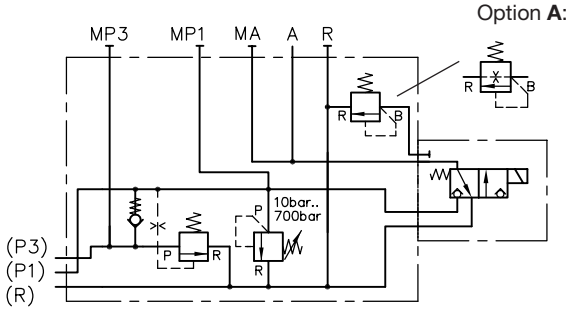
Basic type, size Coding	Ports	Pressure limiting valve Coding	Pressure p_{max} (bar)	Means of adjustment Coding	Adjustment via
NA 21 **NA 21 F.** **NA 31**	ISO 228/1 (BSPP): A, MA, MP1, R = G 1/4 MP3 = G 1/8	**A ...**	700	without screw	Slotted head and hexagon nut
		B ...	500	**D**	Winged screw and hexagon nut
		C ...	315	**R**	Winged screw and winged nut
		E ...	160	**V**	Turn knob (self locking)
		F ...	80	**H**	Turn knob (with lock)
NA 21 NPTF **NA 31 NPTF**	ANSI B1.20.1 ANSI B1.20.3: A, MA, MP1, R = G 1/4-18 NPTF MP3 = G 1/8-27 NPTF				

Description:
The difference between type NA21 and NA31 is only where the main pressure limiting valve is connected to (NA21 to P1 whereas type NA31 to A).
Type NA31 is usually used at applications:
- where only a separate pressure safe guarding of side A and B ensures safe switch-over of the switch-off valve (e.g. p_U = 100 bar, p_A < 105 bar, p_B = 120 bar)
- where a pressure safe guarding is required because external forces act on port A, while the check valve in port P of the directional valve (see table 16) is simultaneously employed.

Symbols

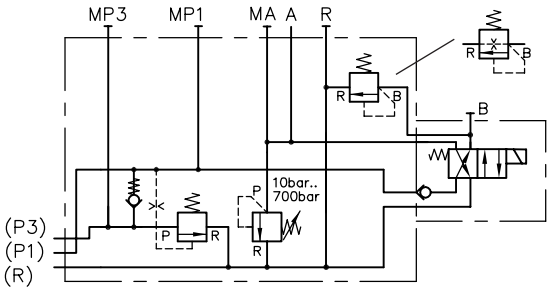
NA 21
NA 21 NPTF

Option **A**:



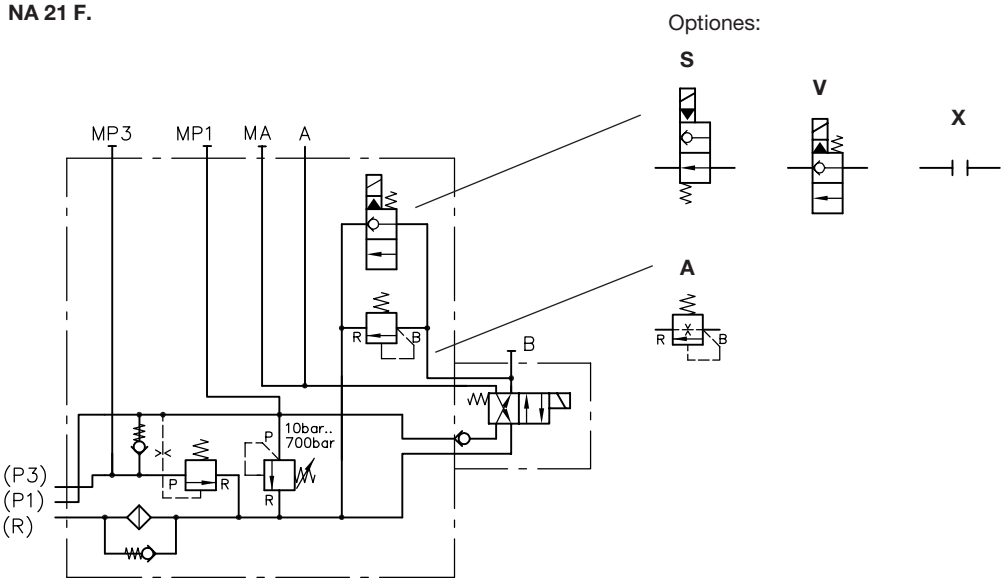
NA 31
NA 31 NPTF

Option **A**:



NA 21 F.

Optiones:



2.2.4 Intermediate blocks

Application: Arbitrary adding or cutting-off pump deliveries i.e. velocity / flow manipulation

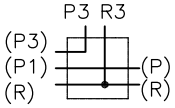
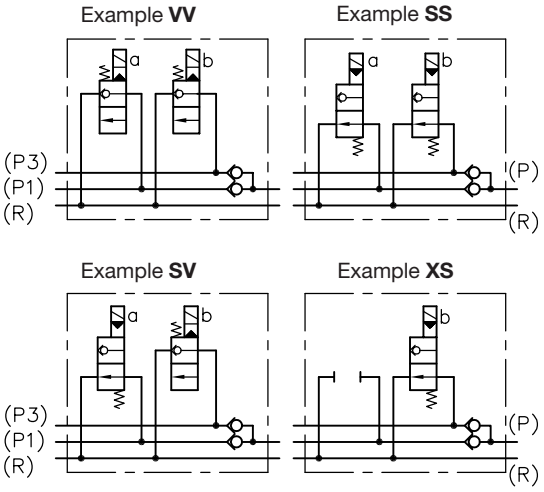
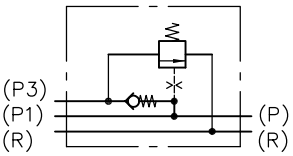
Order examples: **HK449DT/1 - HZ2,5/9,8 - SS - A1/200 -G 24**

Necessary connection blocks acc. to sect. 2.1

Table 19a: Solenoid voltage [1], with type SS...XV

Standard (incl. plug)	G 12	G 24	WG 110	WG 230
Without plug	X 12	X 24	---	---
With LED-plug	L 12	L 24	---	---
Nom. voltage U_N	12V	24V	110V 50/60 Hz	230V 50/60 Hz
	DC-voltage		AC-voltage	
Nominal power P_N	21 W			

Table 19: Intermediate block

Coding		Pressure p_{max} (bar)	Remarks	Symbols (P), (R) = Flange area does not show tapped ports, sealing via O-rings, P, R = Tapped ports
C30 [2]	P3 = G 1/4 R3 = G 3/8	700	For pipe connection, thread ISO 228/1 (BSPP)	
SS	Solenoid a and b = EM11S	450	Utilized directional seated valves type EM11S or EM11V acc. to D 7490/1 [1] Q_{max} = 18 lpm	
SV	Solenoid a = EM11S Solenoid b = EM11V			
VV	Solenoid a and b = EM11V			
VS	Solenoid a = EM11V Solenoid b = EM11S			
SX **VX**	Without idle circulation valve in gallery P3, for P1 = EM11S(V)			
XS **XV**	Without idle circulation valve in gallery P1, for P3 = EM11S(V)			
UNA ...	Autom. idle circulation valve, pressure setting at P3 (bar)	$p_{1\ max}$ = 700 $p_{3\ max}$ = 300 [3]	$Q_{max\ (P1\ +\ P3)}$ = 20 lpm Functional parts identical with type NA sect. 2.2.3.	

[1] The voltage specification will apply also for the solenoid actuation of a possibly mounted directional valve bank. The solenoid voltage has to be specified, when intermediate blocks type SS...XV are ordered individually.
Example: SS - G24
Blanking screw utilized with type X., .X: 7490 105a acc. to D 7490/1.

[2] Similar function like type U4, see sect. 2.4 on page 14

[3] Pressure range: 10 ... 100 bar, 101 ... 150 bar, 151 ... 200 bar — Piston ∅8
Pressure range: 201 ... 255 bar, 256 ... 385 bar, 386 ... 500 bar — Piston ∅5

2.3 Optional intermediate blocks

Application: They enable an additional pressure limitation, lower than the main pressure limitation, which can be activated arbitrarily. Direct mounting is possible onto all connection blocks listed in sect. 2.1 (exceptions: type A13...43 and A51, A61). Direct pipe connection of P and R is not possible, therefore directional valve banks have to be mounted directly.

Attention: These intermediate blocks can not be used together with compact hydraulic power packs type FP acc. to D 7310.

Order examples: HC34/5,1 **- A1/200 -V1/25 -** BWN1F1-S-1-1-G 24

For connection blocks, see sect. 2.1

For suited valve banks ① ② see sect. 2.1.1

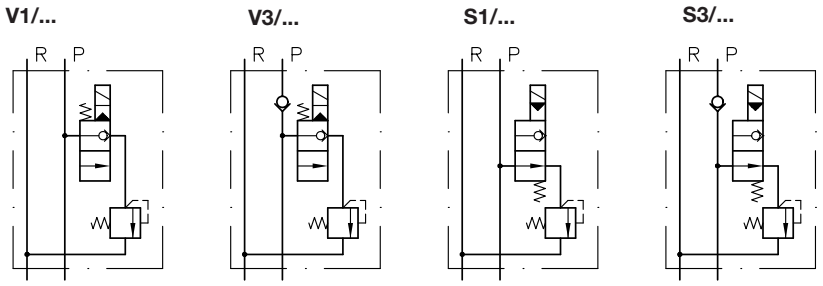
Table 20: Intermediate blocks, p_{max} = 450 bar

Coding Pressure limiting valve Tool adjustable	Manually adjustable	With lock	Pressure range from ... to [1] (bar)	Max. recommended flow (lpm)	Integrated functional elements: Check valve in P	Integrated functional elements: 2/2-way valve acc. to D 7490/1
Pressure setting (bar)						
V1/...	**V2/...**	**V2H/...**	(0) ... 80 (0) ... 160 (0) ... 315 (0) ... 450	18	No	EM11V Blocked when deenergized
V3/...	**V4/...**	**V4H/...**			Yes	
S1/...	**S2/...**	**S2H/...**			No	EM11S Open when deenergized
S3/...	**S4/...**	**S4H/...**			Yes	

[1]) The pressure specification determines the respective pressure range i.e. the spring. Example: S1/140 is covered by the range (0)...160 bar.

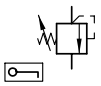
The solenoid voltage has to be specified, when intermediate blocks are ordered individually (see table page 12) Example: V1/320-WG 110

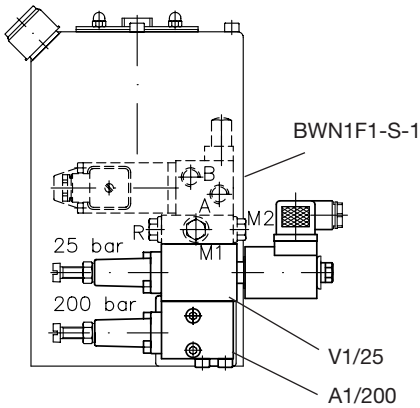
Symbols

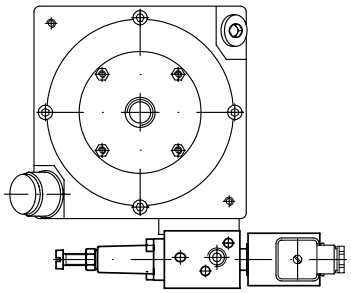


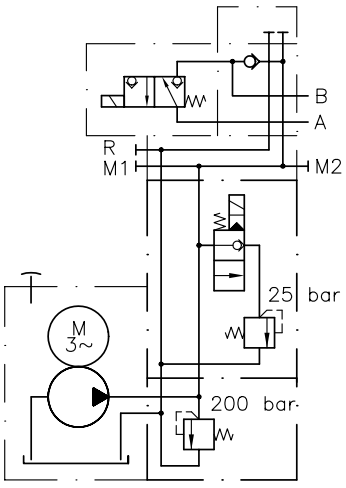
Adjustable
V2/..., V4/...
S2/..., S4/...

With lock
V2H/..., V4H/...
S2H/..., S4H/...









Complete order coding:
HC34/0,9-A1/200-V1/25-BWN1F1-S-1-1-G 24

2.4 Spacer plates

Application: Their purpose is to gain space between the housing of the compact power pack and the directly mounted valve bank. This is necessary e.g. when pressure switches are intended for both consumer sides with type BVZP1 acc. to D 7785 B.
Additional function with type U4: Basically like with intermediate block type C 30 (see sect. 2.2.4), but giving a provision to by-pass the delivery from P3 via R (version U4X).
Additional function with type U 5X: A remotely installed return filter (customer furnished) can be connected via ports K1 and K2.

Order examples: **MP34 - H8,3/B25 - U - A1/200 - BVZP1F - G55/0 - 1 - 1 - G 24**

HK449DT/1 - HZ0,9/9,8 - U2 - AN21F2 - E25 - B500

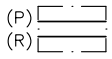
Connection blocks acc. to sect. 2.1 and 2.2

Table 21: Spacer plates

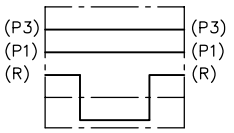
Coding	Height	Fastening via screw
Single circuit pumps		
U	40 mm	M6 or M8
U1	60 mm	M6 or M8
U3	80 mm	M6 or M8
Dual circuit pumps [1]		
U2	40 mm	M6 or M8
U4	30 mm	M8 or M8
U4X	30 mm	M6 or M8
U5	40 mm	M8 [2]
U5X	40 mm	M8 [2]

Symbols

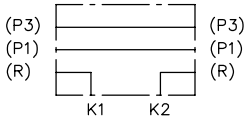
U, U1, U3



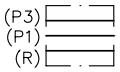
U5



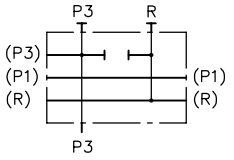
U5X



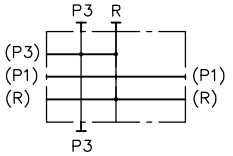
U2



U4



U4X



[1] Spacer plates type U.. are not necessary, when intermediate blocks type SS...XV or C30 acc. to sect. 2.2.4 are utilized.
[2] Only suited for direct mounting onto compact hydraulic power packs type HK(F)4. acc. to D 7600-4, type HK3. acc. to D 7600-3, type HKL(W)3. acc. to D 7600-3L and type HC(W)../HZ(HH) acc. to D 7900.
(also suitcd for single circuit pumps)

2.5 Connection blocks for direct pipe connection

Application: These connection blocks enable to employ the functionality of the connection blocks for single circuit pumps listed in sect. 2.1 together with directly mounted valve banks while using pipes as connection to the hydraulic supply.

Order examples:

C16 - AP1F3 - P4 - 44 - BA2 - NSWP2 G/0
- NSWP2 D/0 - 1 - G 24

Connection blocks for single circuit pumps acc. to sect. 2.1

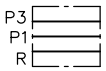
Directional valve banks ① ② see sect. 2.1.1

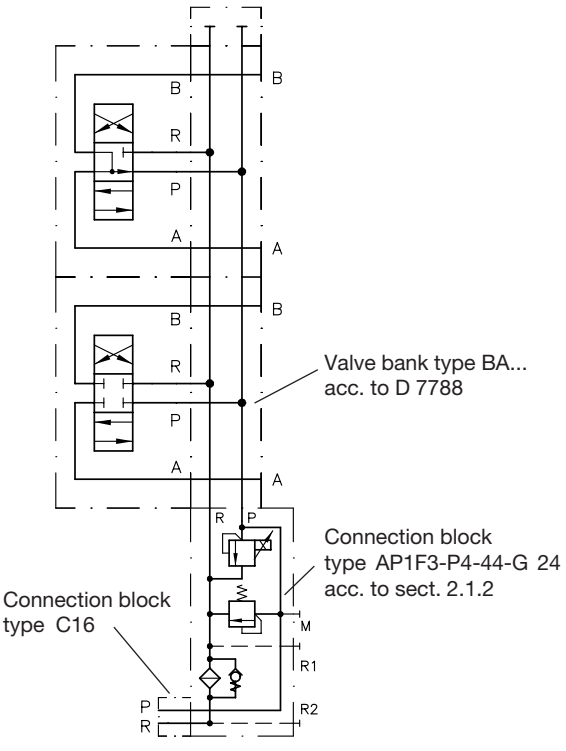
Table 22: Connection blocks

Coding	Ports P and R ISO 228/1 (BSPP)
Single circuit pumps	
C15 [1]	G 1/4
C16 [1]	G 3/8
Dual circuit pumps	
C36 [2]	G 3/8

C15, C16

C36





[1] This combination is not possible for connection blocks type AL 21 acc. to sect. 2.1.4
[2] Also suitcd for type AL 21

3. Data and parameters

3.1 General data

Coding: Connection or intermediate block according to type coding

Fastening: Onto compact hydraulic power packs type

HC, HCW, HCG	acc. to D 7900, D 7900 G
HK, HKF, HKL	acc. to D 7600 ++
MP, MPW	acc. to D 7200, D 7200 H
FP	acc. to D 7310
KA	acc. to D 8010
MPN	acc. to D 7207

Via two skt.-head screws M6 (M8 with type AL 21(221), AN, SS...VX, C30)

Pipe connection

P	Pump delivery (port size dep. on type)
R	Return (port size dep. on type)
R1, R2	Return for clogging gauge (G 1/4)
S, S1, S3	Accumulator port (G 1/2)
M	Pressure gauge port (G 1/4)

Ports conforming ISO 228/1 (BSPP)

Surface treatment: Zinc galvanized (type NA nitrous hardened)

Mass (weight) approx. kg

Type	A 1...4 A 14(15)	A 13...43	A 51(61)	AS 1...4 AV 1...4	AK 1(3) AM 1(3)	AP 1(3)	AL 11(12) AL 21
without filter	0.6	0.9	1.0	0.9	-	1.1	1.7
F0, F1, F2	2.9	-	-	3.2	3.5	4.1	4.9
F3	3.2	-	-	3.6	3.8	4.4	5.2
D10(0)	-	-	-	-	-	-	6.2(4.1)

Type	AN	NA	AL 221	SS VV SV VS	XS, SX XV, XV UNA	C 30 U 4. U 5.	S./.. V./..	U U 2	U 1 U 3	C 15 C 16 C 36
without filter	4.5	3.6	4.9	1.9	1.6	0.5	0.8	0.1	0.15	0.2

Temperature: Ambient: approx. -40 ... +80°C
Fluid: -25 ... +80°C, pay attention to the viscosity range!
Start temperature down to -40°C are allowable (Pay attention to the viscosity range during start!), as long as the operation temperature during subsequent running is at least 20K higher. Biological degradable pressure fluids: Pay attention to manufacturer's information. With regard to the compatibility with sealing materials do not exceed +70°C.

Hydraulic fluid: Hydraulic oil conf. DIN 51524 table 1 to 3; ISO VG 10 to 68 conf. DIN 51 519
Viscosity range: min. approx. 4; max. approx. 1500 mm^2/sec; optimum: 10 to 500 mm^2/sec
Also suitable are biologically degradable pressure fluids type HEES (synth. Ester) at operation temperatures up to approx. +70°C.

Pressure adjustment: Adjustment of pressure limiting valves

Type	Utilized type	Variation per turn (Δbar /turn) Pressure range 0...80	0...160	0...315	0...500	0...700
A1...4, 14, 15 **AP1(3)F** **AS., AV., AK., AM.** **S1(..4)/.., V1(..4)/.., NA** (p_{max})	MVF4 acc. to D 7000 E/1	9.5	19	55	100	195
NA (Main pressure limiting valve) (p_B, Δbar /mm) [1]		13	19	42	66	-
A 13...43 **A 51(61)**	MVF5 acc. to D 7000 E/1	9	17	51	65	105
AN	CMV1 acc. to D 7000 E/1	12	33	51	94	-

[1]) Differing pressure ranges, see sect. 2.2.2

Adjustment of the switch-off pressure

Type	Utilized type	Variation per turn (Δbar /turn) Pressure range B	C	D	E	F
AL11(12)	LV10 acc. to D 7529	--	22	12	8	--
AL21 **AL221**	LV20 acc. to D 7529	--	13	9	5	3
		Variation per mm (Δbar /mm)				
AN	CNE2 acc. to D 7710 NE	2.5	1.7	1.1	0.9	--
NA, UNA	--	26.2	15.5	11.8	--	--

3.2 Electrical data

Idle circulation valves

Connec. block, ancillary block		AS, AV, SS...XV, S./.., V./.., NA..F				AK, AM			
Valve type		EM11S(V) EM21S(V)				WH1F(D)			
Pamphlet		D 7490/1				D 7470 A/1			
Nom. voltage	U_N	12V DC	24V DC	98V DC 110V AC [1]	205V DC 230V AC [1]	12V DC	24V DC	98V DC 110V AC [1]	205V DC 230V AC [1]
Nominal power	P_N (W)	21	21	21	21	24.4	24.4	24.4	24.4
Nom. current	I_N (A)	1.21	0.63	0.22	0.1	2	1	0.25	0.14
Protection class		IP 65 acc. to IEC 60529 (with properly mounted plug)							
Relative duty cycle		100% ED							

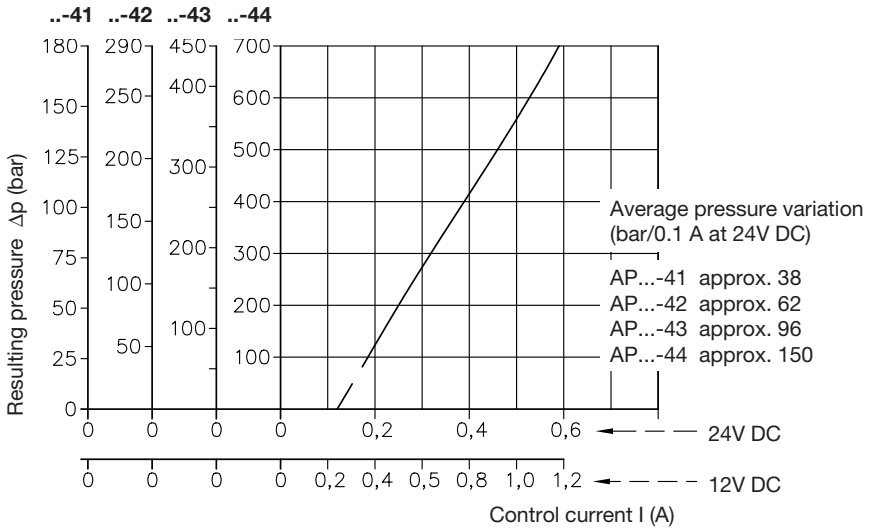
[1] Plug with bridge rectifier circuit

Proportional pressure limitation

Nom. voltage U_N		12V DC	24V DC
Coil resistance	R_{20} ± 5%	6 Ω	24 Ω
Current, cold	I_{20}	2 A	1 A
Nom. current	I_N	1.26 A	0.63 A
Power, cold	P_{20}	24 W	24 W
Nominal power	P_N	9.5 W	9.5 W
relative duty cycle		100% ED (Reference temperature ϑ_{11} = 50°C)	
Electrical connection		Industrial standard (similar to EN 175 301-803)	
Protection class		IP 65 acc. to IEC 60529 (with properly mounted plug)	
Required dither frequency		60 ... 150 Hz	
Dither amplitude		20 ... 40% of I_{20}	

Δp-I-curve for proportional pressure limiting valve

Example: Type AP 14-44-G 24



3.3 Versions with return and pressure resistant filter

Version with return filter

Utilized Filter elements	Coding	F0:	Type W77/2 Co. MANN and HUMMEL GmbH, D-71761 Ludwigsburg
		F1:	HAWE 6905 117F1
		F2:	HAWE 6905 117F2
		F3:	HAWE 6905 117F3
Fastening	Central thread 3/4-16UNF		
Filter material	Soaked paper		
Filter fineness	Coding	F0:	12 µm nom. 50% / 30 µm abs.
	Coding	F1, F2, F3:	6 µm nom. 50% / 12 µm abs. ($\beta_{12} \geq 75$)
Filter area (guide line)	Coding	F0:	637 cm²
		F1:	1230 cm²
		F2:	1900 cm²
		F3:	3190 cm²

Clogging indicator with type A...F.V	Setting of the pressure switch	p = 2.1 bar
	Electrical switch	NC-contact
	Switching performance	100 W
	Switching voltage	max. 42 V
	Protection class	IP 65 (with cap)
	Body	zinc galvanized (Fe/Zn12cC)
	Mechanical service life	10^6 Operation cycles
	Switching frequency	200/min
	HAWE order number	6905 199
	Make	Co. SUCO

Visual clogging indicator at type A...F.G

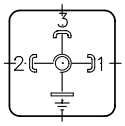
Servicing is necessary, when the indicator hits the red area during operation of the system.

Range	0...6 bar
Indication for filter maintenance	2 bar
Perm. pressure peaks (take into account sufficient filter size!)	10 bar

Version with pressure resistant filter

Clogging indicator with type AL21D10V	Filtration level	10 µm (β_{10} = 75)
	Difference pressure switch	p = 2 bar
	Electrical switch	Reed-contact, change-over switch
	Switching performance	max. 3 W
	Switching voltage	max. 175V DC
	Switching current (OHM-load)	max 0.25 A
	Plug A	DIN 43650
	NC-contact	Terminals 1-3
	NO-contact	Terminals 1-2

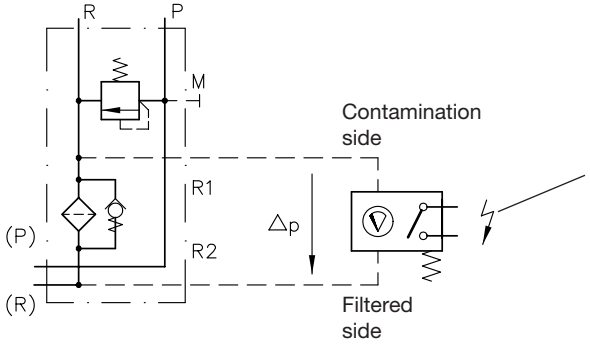
Terminals



Other ways of clogging detection

Beside the already detailed means of clogging detection via pressure switch at return filters (see table 4 in sect. 2.1.1) or at pressure resistant filters (see table 10 in sect. 2.1.4) all connection blocks with return filter feature ports R1 and R2. A common difference pressure indicator or switch can be connected there, enabling permanent monitoring of the clogging level. Most makers of filters do have difference pressure indicators in their product range. The back pressure of a new filter is usually in the range of 0.2 ... 0.3 bar. The check valve integrated in the filter element usually opens at approx. 2.5 bar. Therefore $\Delta p \approx 2$ bar is the limit when the filter has to be replaced latest.

Example: Difference pressure switch (maintenance indicator) with visual and electrical signal (here NO-contact)



The switching performance may vary depending on make; The respective notes of the manufacturer have to be observed!.

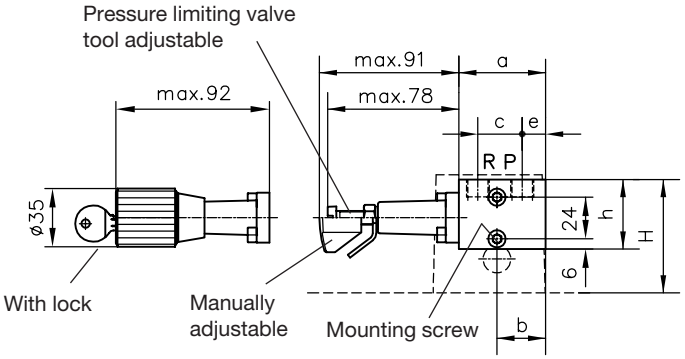
4. Unit dimensions
All dimensions in mm, subject to change without notice!

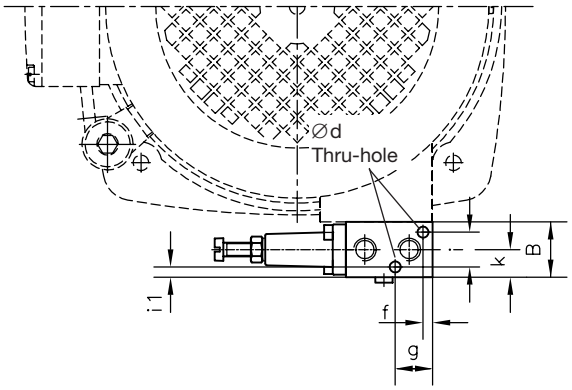
4.1 Connection blocks for single circuit pumps

4.1.1 Connection blocks acc. to sect. 2.1.1

Illustrated is the installation at compact power packs type HK acc. to D 7600 ++

A1/.. to A4/... (without return filters)
A13/.. to A43/...
A14(15)/...





The arrangement with compact power packs type HC acc. to D 7900 is similar.
Important are the distance dimensions of the connection pedestal, where A1/... to A43/... are to be mounted.
These dimensions are illustrated in the corresponding pamphlets to the compact power packs.

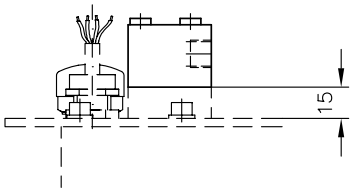
Type	P, R	H	B	a	b	c	Ød	e
A1/.. to A4/.. A14(15)/...	G 1/4	65(61) [1]	32.5	50	27.8	25.5	6.4	13.3
A13/.. to A43/..	G 3/8	70(66) [1]	40	60	32	30	8.4	15

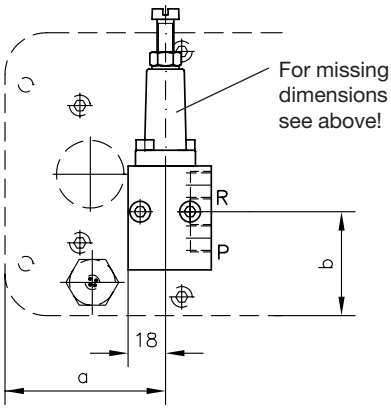
Type	f	g	h	i	i1	k	Mounting screw
A1/.. to A4/.. A14(15)/...	5.3	21.5	40	20	6	16	2x M6x40-8.8
A13/.. to A43/..	7	23	45	28	5.5	19.5	2x M6x50-8.8

[1] Figures in brackets apply to installation onto the second connection pedestal of type HK 4.. acc. to D 7600-4.

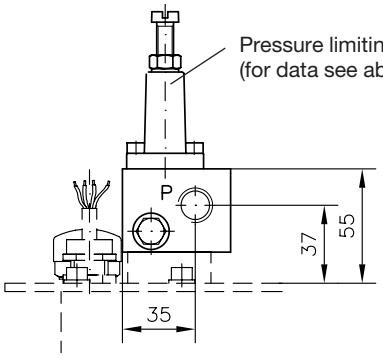
Illustrated is the installation at power packs type MP acc. to D 7200 H

A1/.. to A4/... (without return filters)
A13/.. to A43/...
A14(15)/...



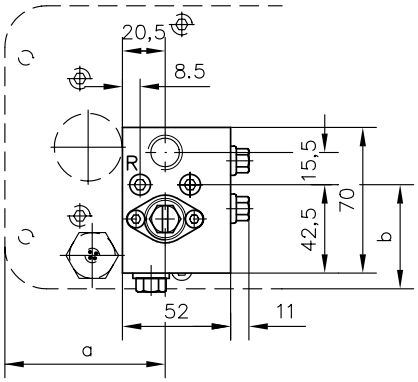


A51/... and A61/...



Ports conf. ISO 228/1 (BSPP):
P, R = G 3/8

Mounting screw
2x M6x40-8.8

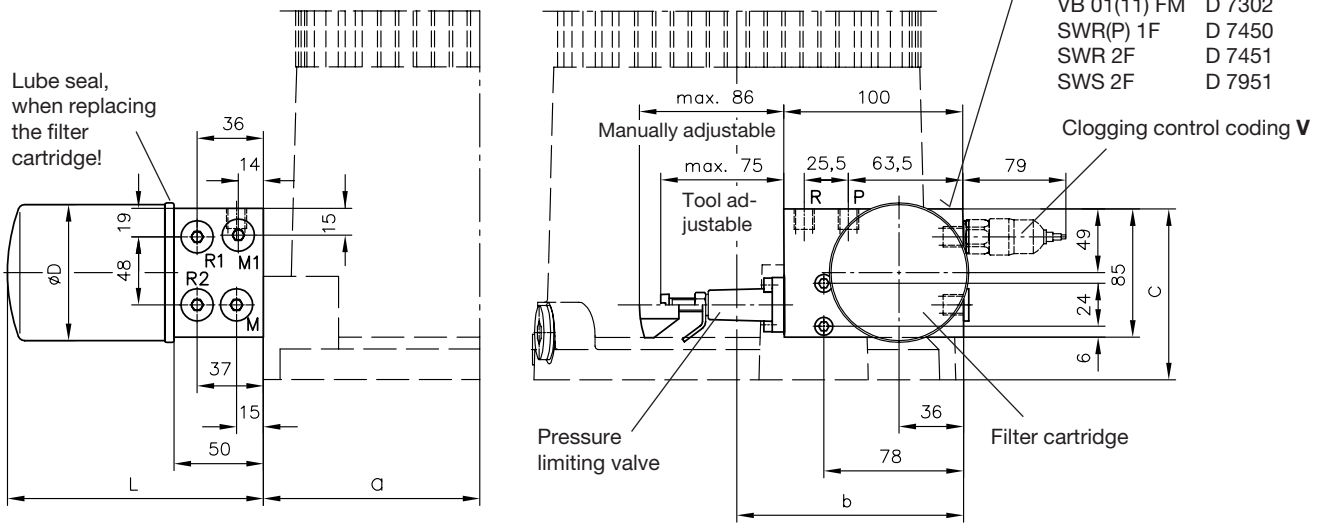


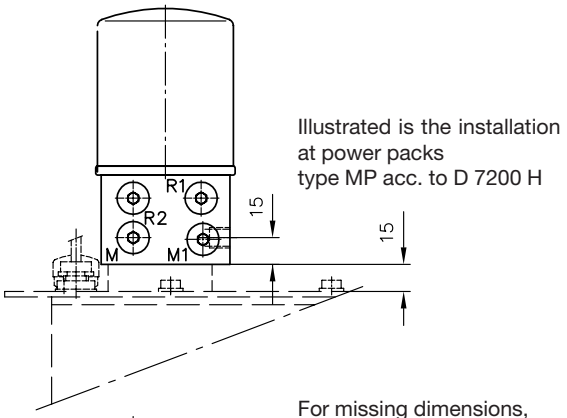
Tank size	a	b
B3	77	50
B5	92	50
B10	95	50
B25	105	50
B55	135	115
B110	135	115

Type A1F./... to A4F./... (with return filter)

Suited directional valve banks for direct connection

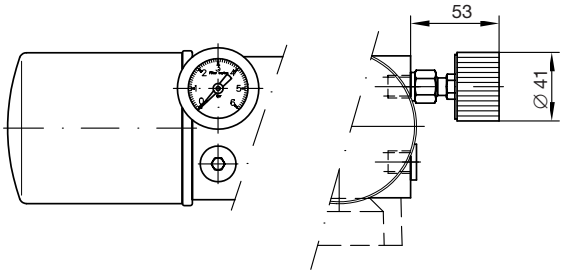
BA 2	D 7788
BWN(H) 1F	D 7470 B/1
BWH 2F	D 7470 B/1
VB 01(11) FM	D 7302
SWR(P) 1F	D 7450
SWR 2F	D 7451
SWS 2F	D 7951





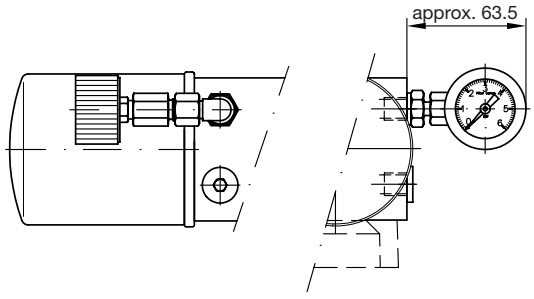
Illustrated is the installation at power packs type MP acc. to D 7200 H

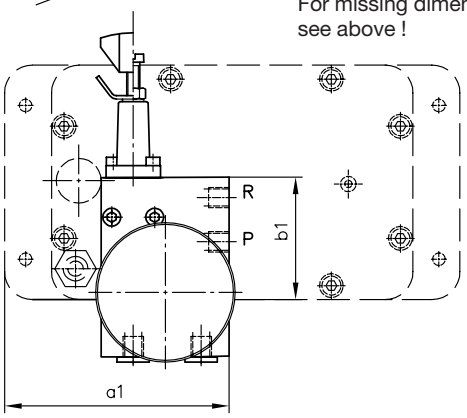
Clogging control coding **G**



For missing dimensions, see above !

Clogging control coding **G1**





Ports conf. ISO 228/1 (BSPP):
P, R, R1, R2, M, M1 = G 1/4

Mounting screws 2x M6x50-8.8

	Compact hydraulic power pack type				
	HK ...	HC 1..	HC 2..	HC 3..	HC 4..
a	124	70	85	102	124
b	128	102	117	130	143
c	110	89	89	97	97

	Filter coding			
	F0	F1	F2	F3
∅D	76	76	76	93
L	109	143	173	192

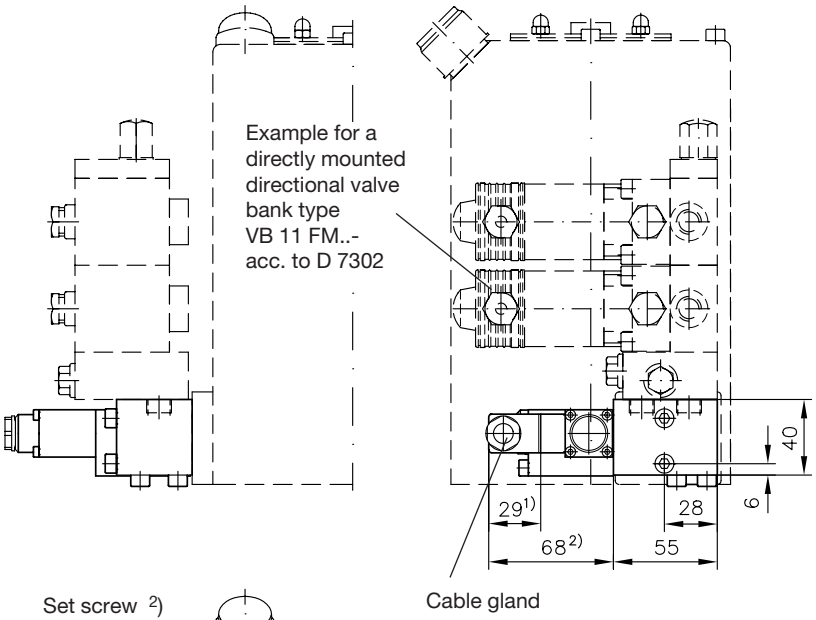
	Power pack type MP ... Tank size				
	B 3	B 5	B 10	B 25	B 55
a1	131	146	149	159	189
b1	72	72	72	72	137

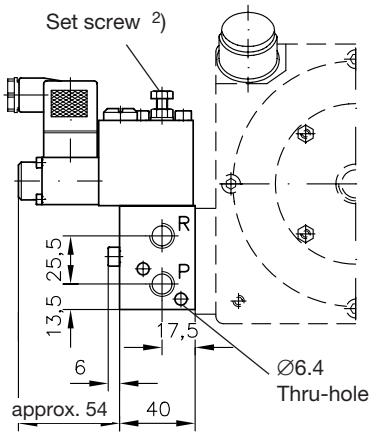
All dimensions in mm, subject to change without notice!

4.1.2 Connection blocks with prop. pressure limiting valve acc. to sect. 2.1.2

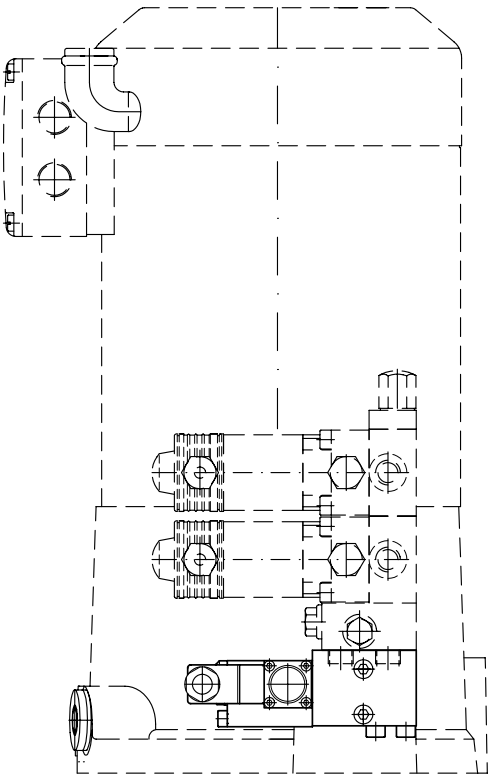
Type AP1(3) (without return filters)

Illustrated is the installation at power packs type HC(W) acc. to D 7900





Illustrated is the installation at compact power packs type HK(F) acc. to D 7600 ++

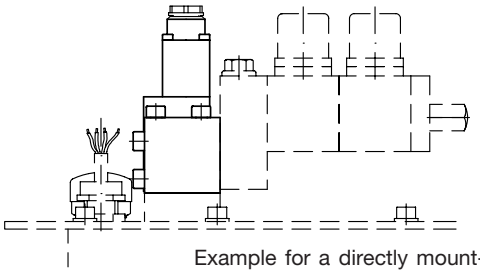


Ports conf. ISO 228/1 (BSPP):
P, R = G 1/4

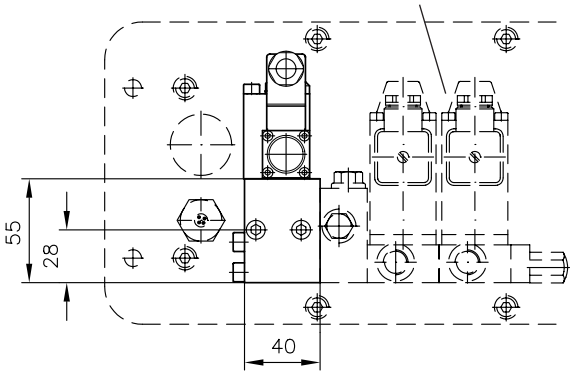
Mounting screws 2x M6x50-8.8

For missing dimensions, see D 7485/1!

Illustrated is the installation at power packs type MP acc. to D 7200 H



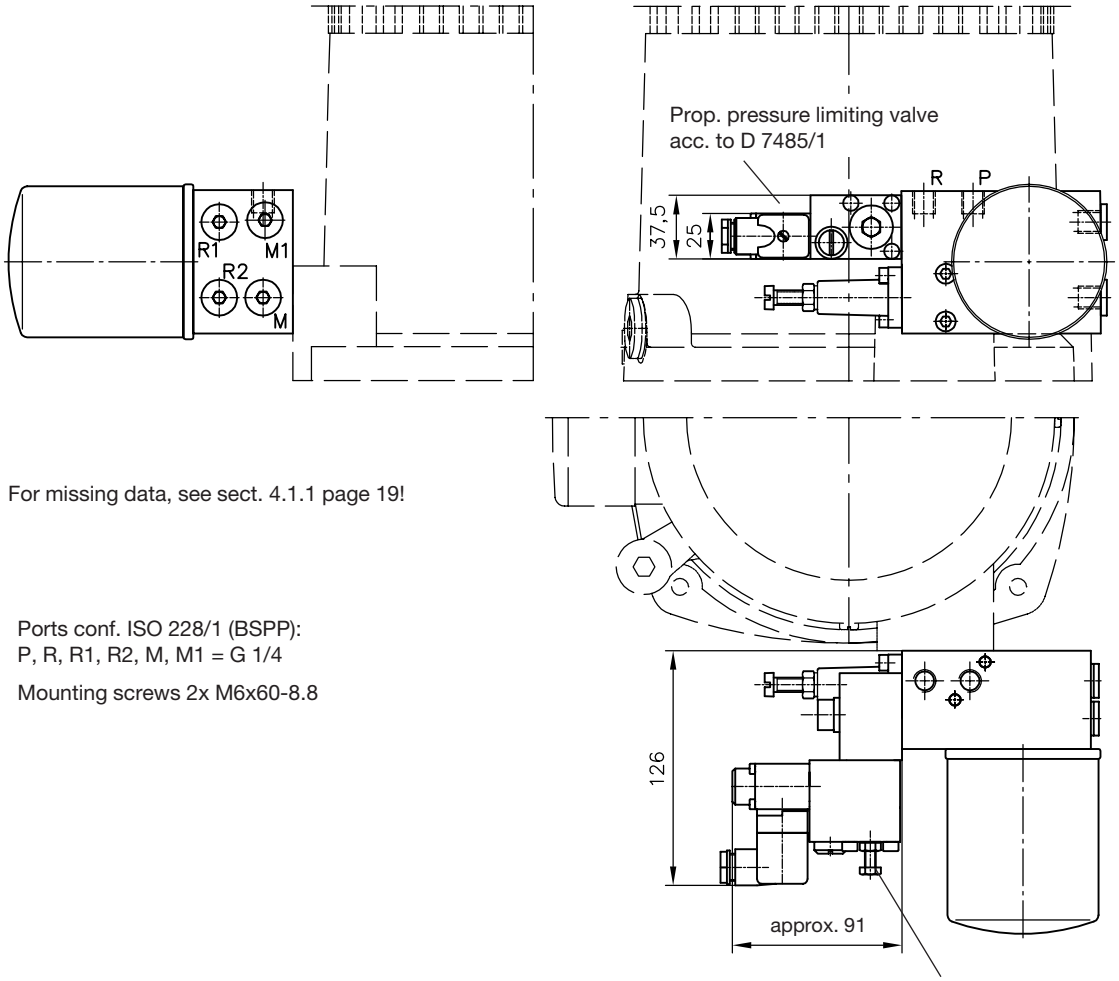
Example for a directly mounted directional valve bank type BWN 1F..- acc. to D 7470 B/1



1) This dimension depends on the manufacturer and may be max. 40 mm acc. to EN 175 301-803.

2) This setscrew allows the minimum pressure p_{min} (sect. 2.1.2, table 6) to be raised or lowered. This prevents that the pressure drops below this min. pressure setting even when a lower control current would otherwise cause it. The lock nut a/f 10 (Seal-Lock nut) has to be loosened sufficiently to prevent any damage of the vulcanized seal by the thread.
Attention: A minimum pressure p_{min} of 3 ... 5 bar is required.

Type AP 1(3) (with return filters)



For missing data, see sect. 4.1.1 page 19!

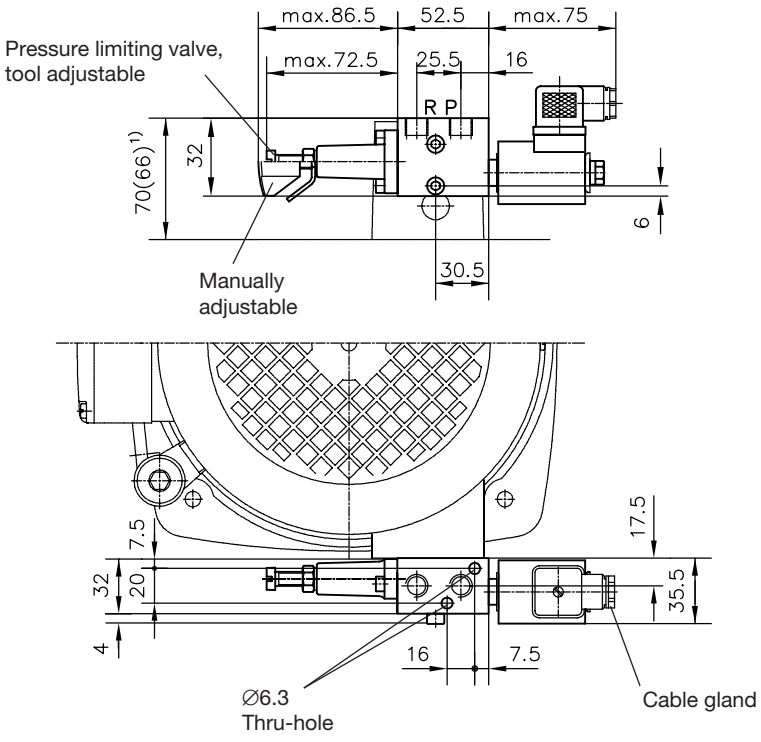
Ports conf. ISO 228/1 (BSPP):
P, R, R1, R2, M, M1 = G 1/4

Mounting screws 2x M6x60-8.8

Regarding the set screw, see foot note [2]) on page 20

4.1.3 Connection blocks with idle circulation valve acc. to sect. 2.1.3

Type AS1...4 (without return filters)
AV1...4



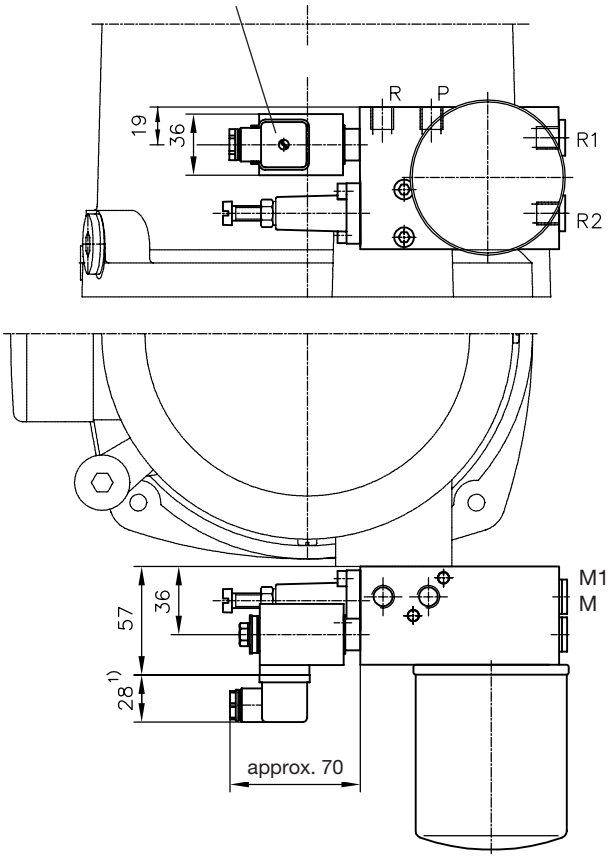
Ports conf. ISO 228/1 (BSPP):
P, R = G 1/4

Mounting screws 2x M6x45-8.8

[1]) Figures in brackets apply to installation onto the second connection pedestal of type HK 4.. acc. to D 7600-4

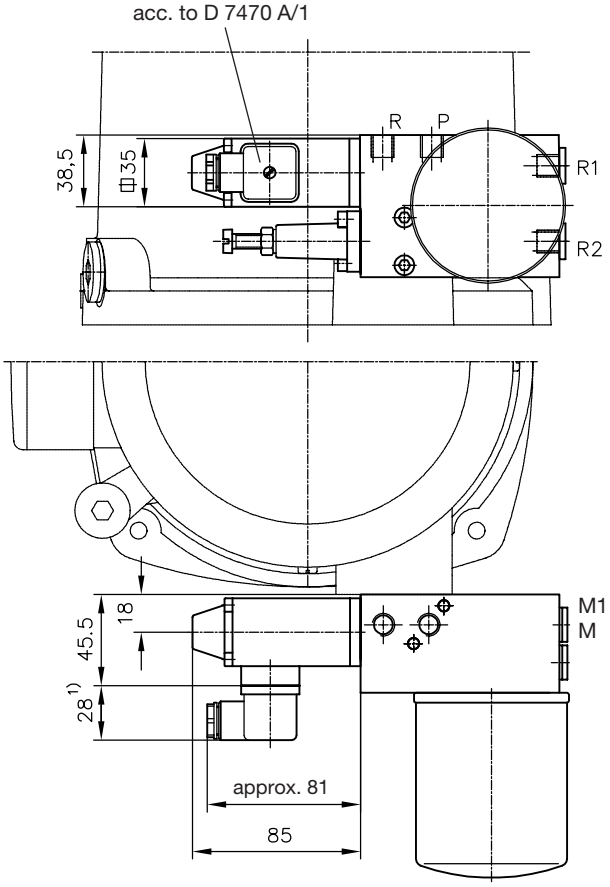
Type AS 1...4F.. (with return filter)
Type AV 1...4F..

Idle circulation valve type EM 21S
acc. to D 7490/1



Type AK 1(3) (with return filter)
Type AM 1(3)

Idle circulation valve type WH 1D(F)
acc. to D 7470 A/1



For missing data, see sect. 4.1.1, page 19!

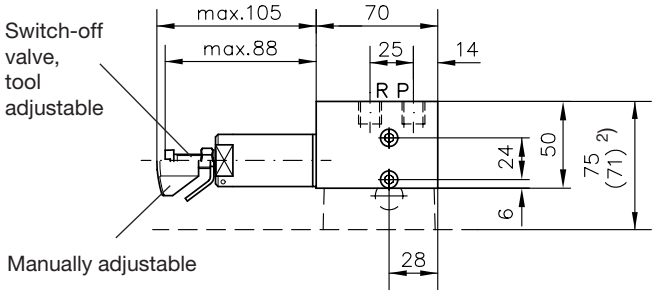
1) This dimension depends on the manufacturer and may be max. 40 mm acc. to EN 175 301-803

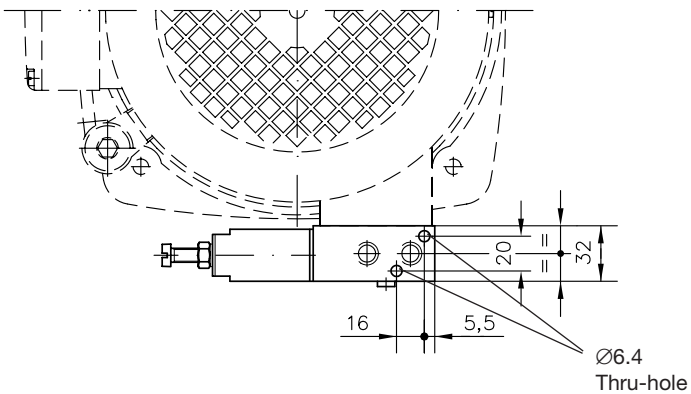
Ports conf. ISO 228/1 (BSPP):
P, R, R1, R2, M, M1 = G 1/4

Mounting screws 2x M6x50-8.8

4.1.4 Connection blocks with switch-off valve acc. to sect. 2.1.4

Type AL11(12) (without return filter)



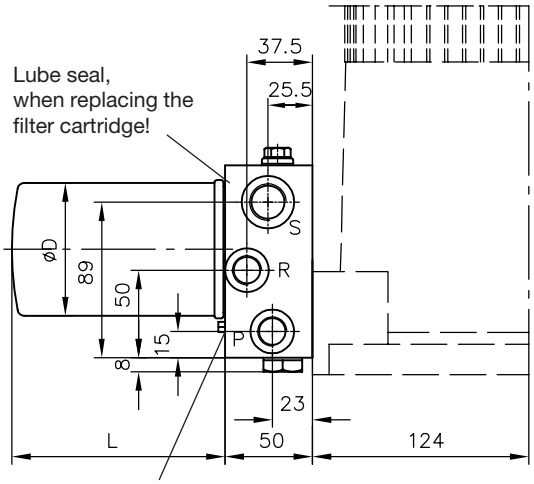


Ports conf. ISO 228/1 (BSPP):
P, R = G 1/4

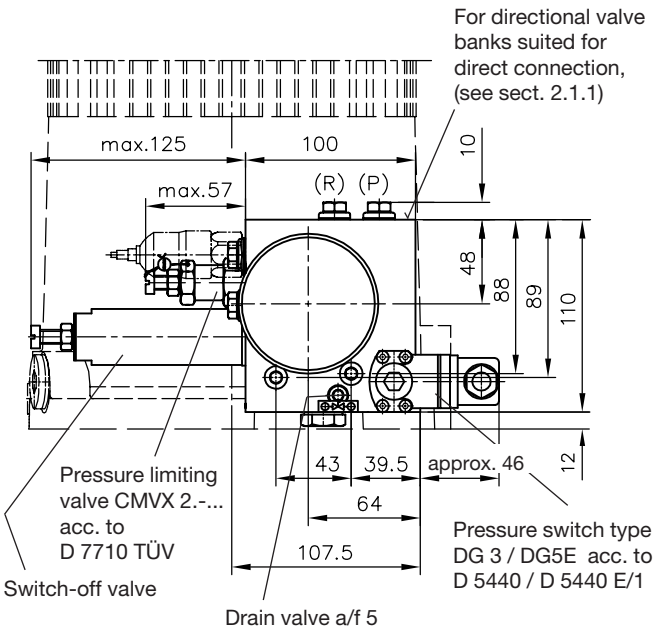
Mounting screws 2x M6x45-8.8

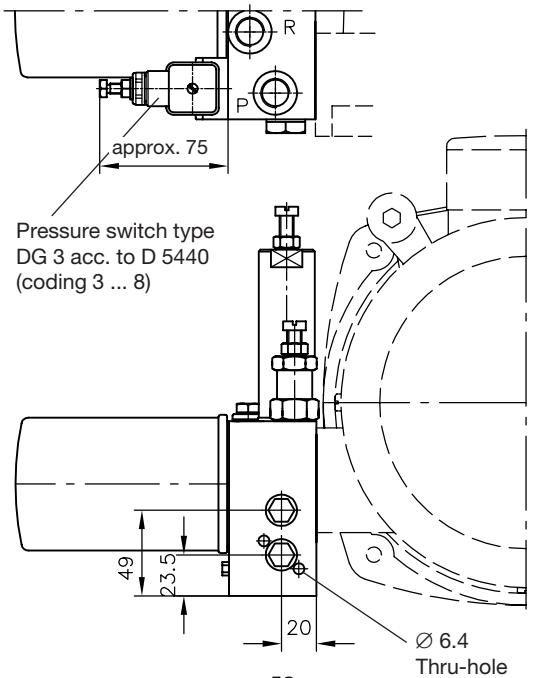
2) Figures in brackets apply to installation onto the second connection pedestal of type HK 4.. acc. to D 7600-4

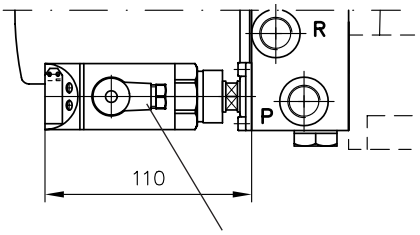
Type AL 21 F... (with return filter)

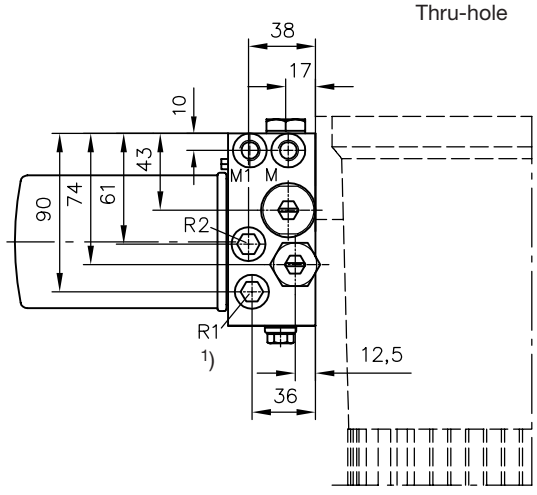


Prepared for mounting of pressure switch type DG 3..- (coding 2)









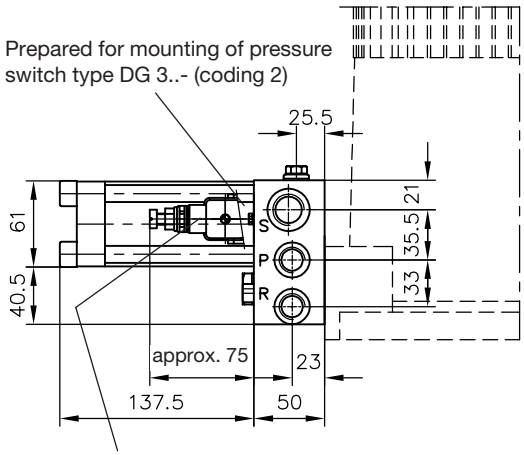
	Filter coding			
	F0	F1	F2	F3
ØD	76	76	76	93
L	59	93	123	142

Ports conf. ISO 228/1 (BSPP):
P and R = G 3/8
R1 = M18x1.5
R2 = G 1/4
M = G 1/4
S = G 1/2

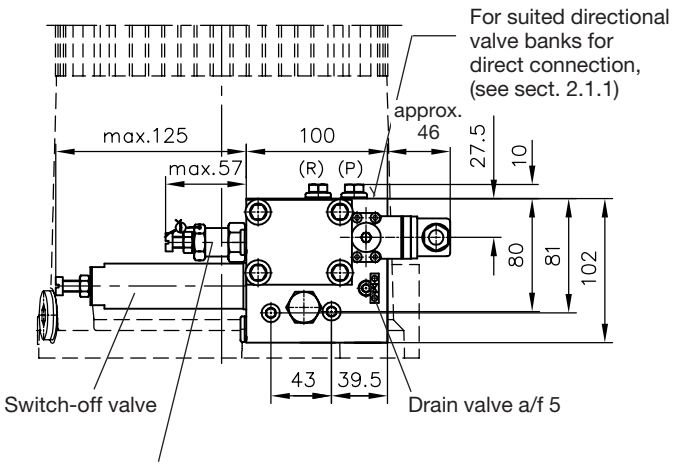
Mounting screws 2x M8x55-8.8

[1]) Port for clogged filter indicator coding **V**, **G** and **G1**.
Contrary to illustration on page 19 an additional adaptor M18x1.5-G1/4 (approx. 15 mm) is required

Typ AL 21D... (with pressure filter)



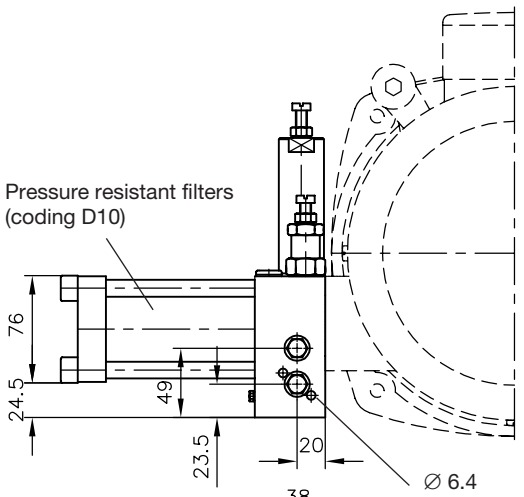
Pressure switch type DG 3..
acc. to D 5440 (coding 3 ... 8)
or type DG5E
acc. to D 5440 E/1 (see page 23)

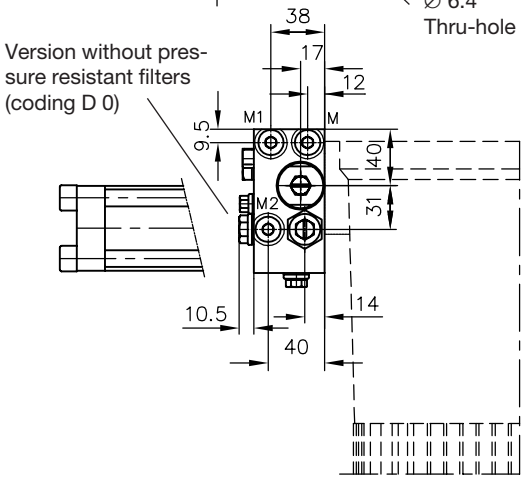


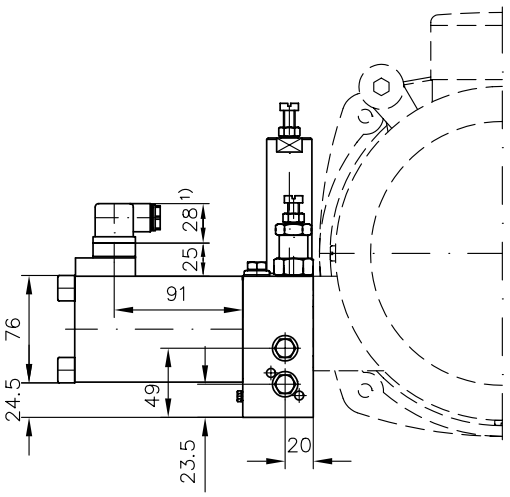
Pressure limiting valve CMVX 2.-...
acc. to D 7710 TÜV

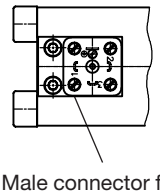
Ports conf. ISO 228/1 (BSPP):
M1 and M 2 = G 1/4
P and R = G 1/8
S = G 1/2

Mounting screws 2x M8x65-8.8









NC-contact Terminals 1-3
NO-contact Terminals 1-2

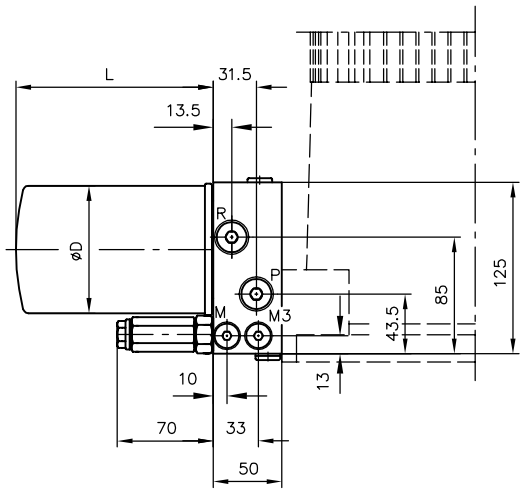
Male connector for clogging indicator

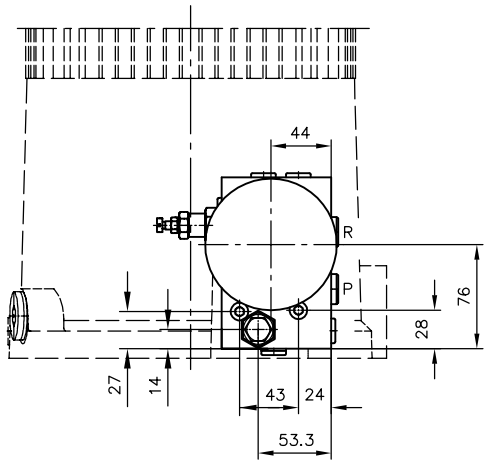
1) This dimension depends on the manufacturer and may be max. 40 mm acc. to EN 175 301-803

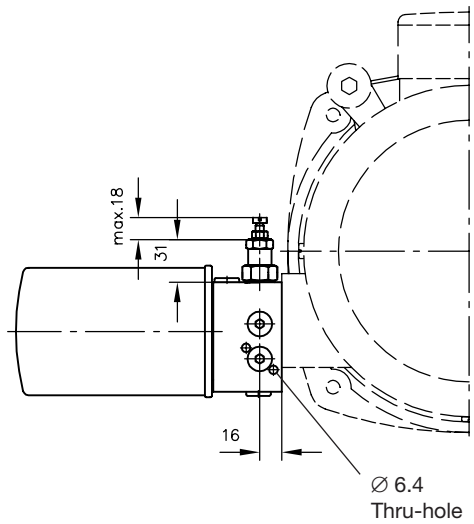
4.2 Connection blocks for dual circuit pumps acc. to sect. 2.2

4.2.1 Connection blocks with two stage valve acc. to sect. 2.2.1

Type AN



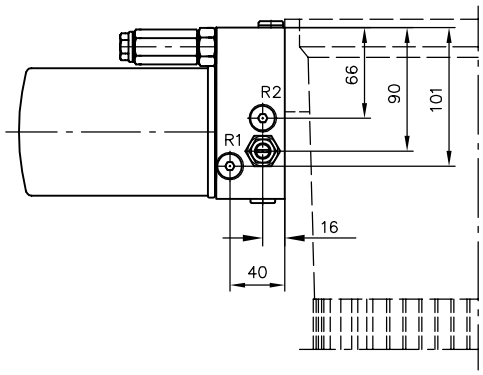




	Filter coding			
	F0	F1	F2	F3
∅D	76	76	76	93
L	59	93	123	142

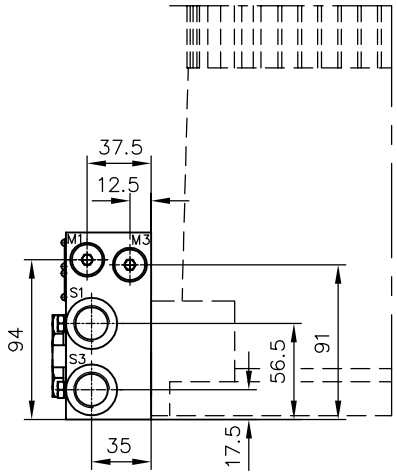
Ports conf. ISO 228/1 (BSPP):
P, R = G 3/8
R1, R2 = G 1/4
M, M3 = G 1/4

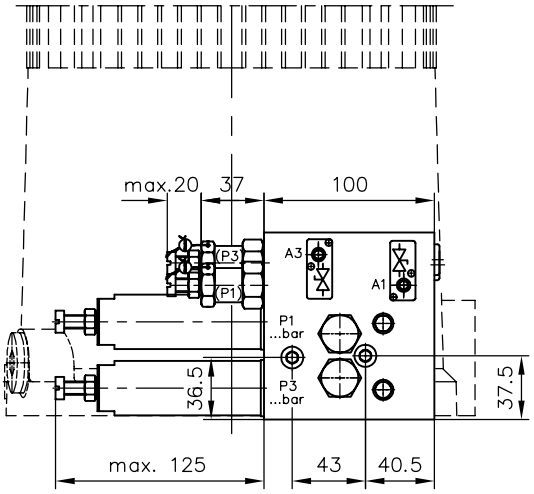
Mounting screws 2x M8x55-8.8

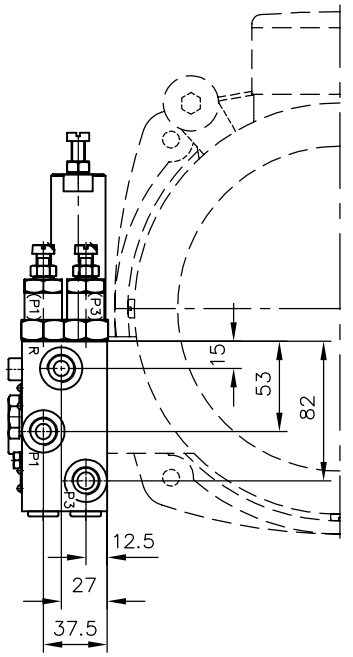


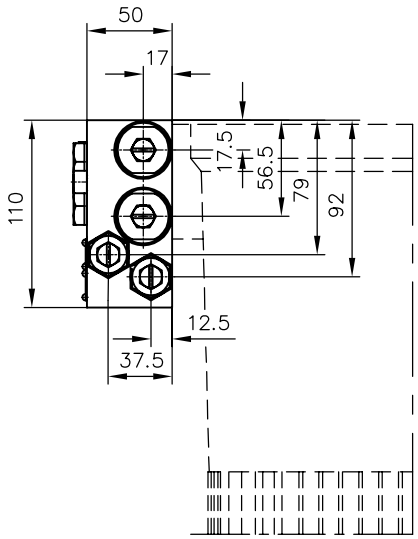
4.2.2 Connection blocks with double switch-off valve acc. to sect. 2.2.2

Type AL 221







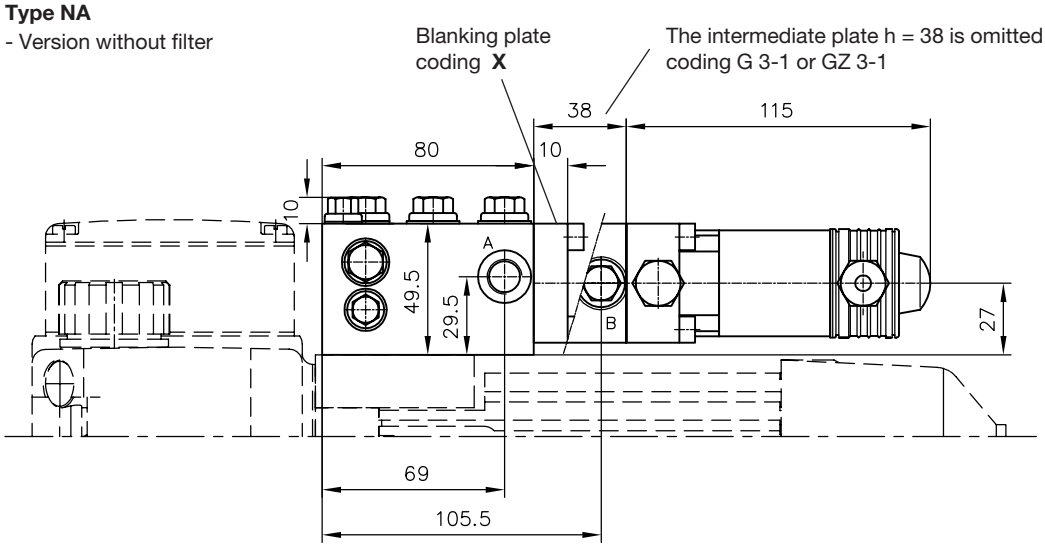


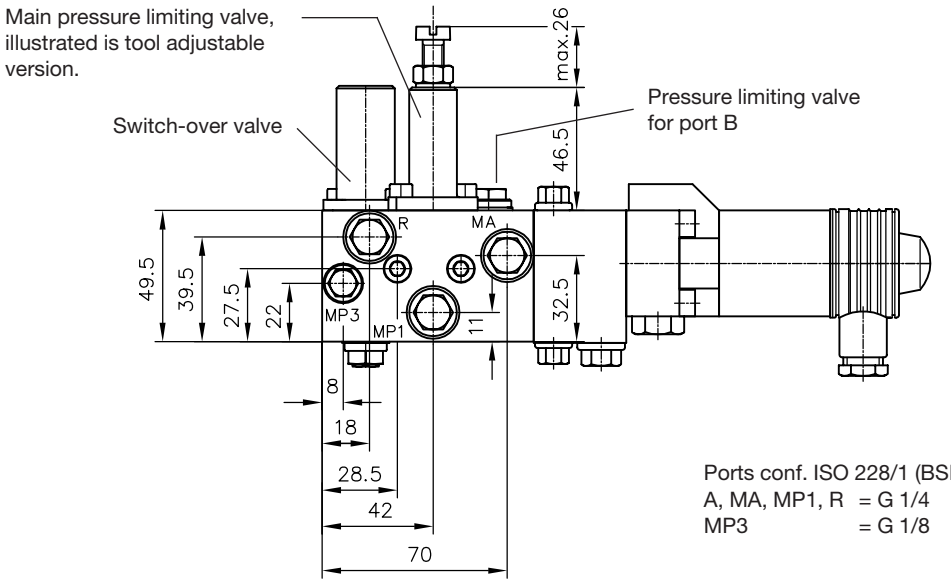
Ports conf. ISO 228/1 (BSPP):
P1, P3, R = G 3/8
S1, S3 = G 1/2
M1, M3 = G 1/4

Mounting screws 2x M8x65-8.8

4.2.3 Connection blocks with two stage valve acc. to sect. 2.2.3

Type NA
- Version without filter



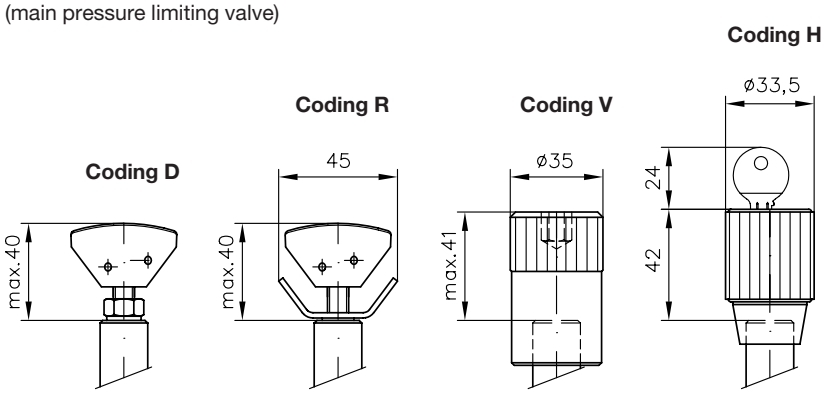


Ports conf. ISO 228/1 (BSPP):
A, MA, MP1, R = G 1/4
MP3 = G 1/8

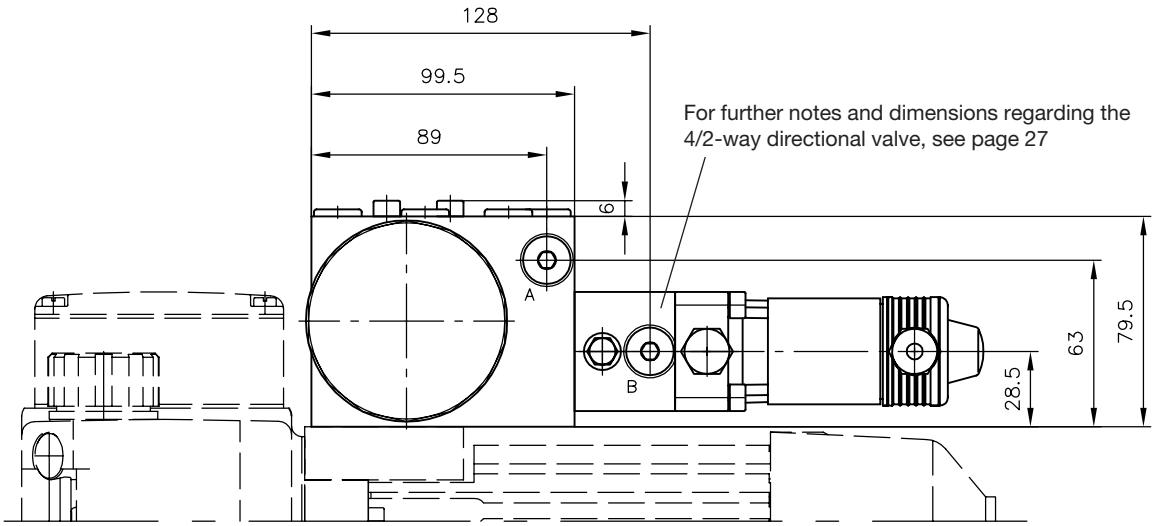
Ports conf. ANSI B1.20.1(3):
A, MA, MP1, R = G 1/4-18 NPTF
MP3 = G 1/8-27 NPTF

Mounting screws 2x M6x60-8.8

Additional versions for the adjustment
(main pressure limiting valve)

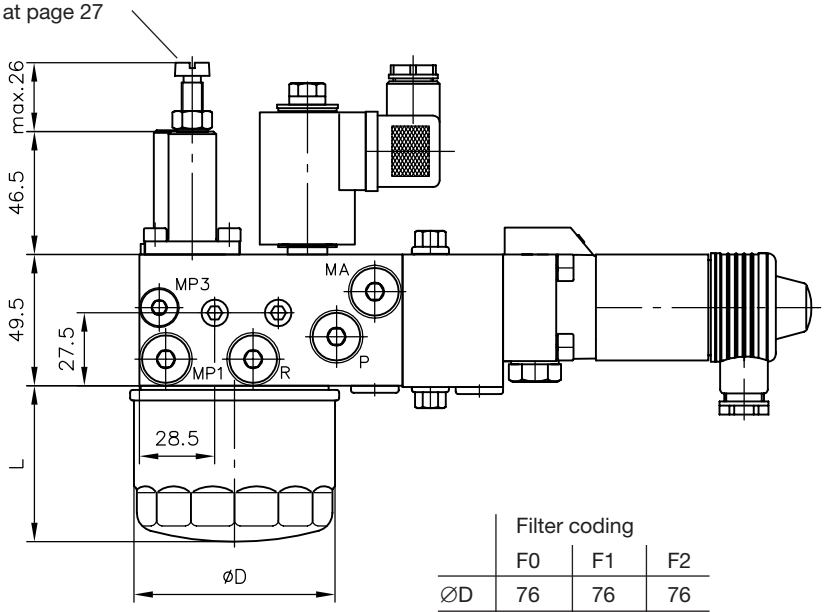


Type NA 21 F..
- Version with filter



For further notes and dimensions regarding the 4/2-way directional valve, see page 27

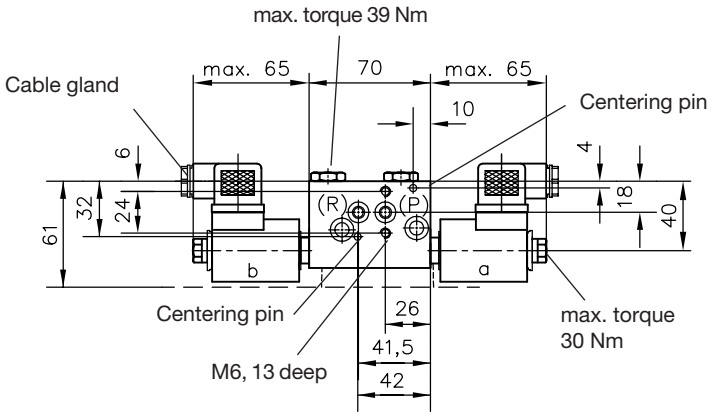
Main pressure limiting valve, illustrated is tool adjustable version.
See also bottom at page 27

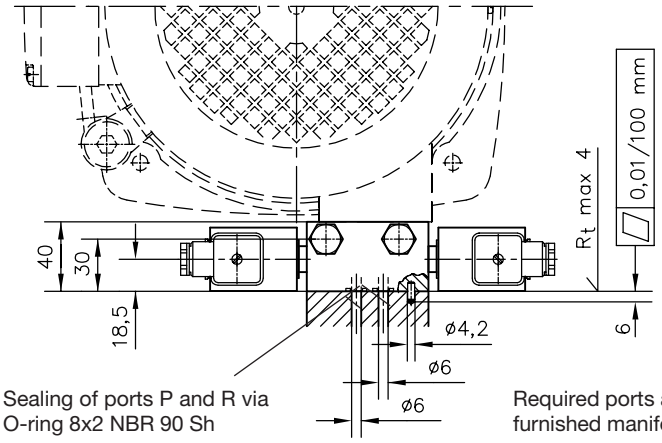


	Filter coding		
	F0	F1	F2
∅D	76	76	76
L	109	143	173

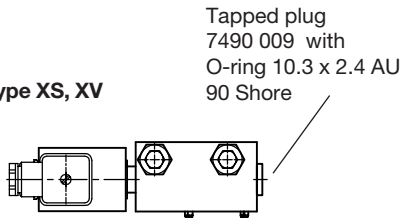
4.2.4 Intermediate blocks acc. to sect. 2.2.4

Type SS, VV, SV, VS

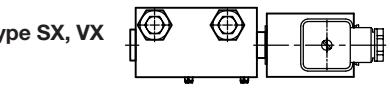




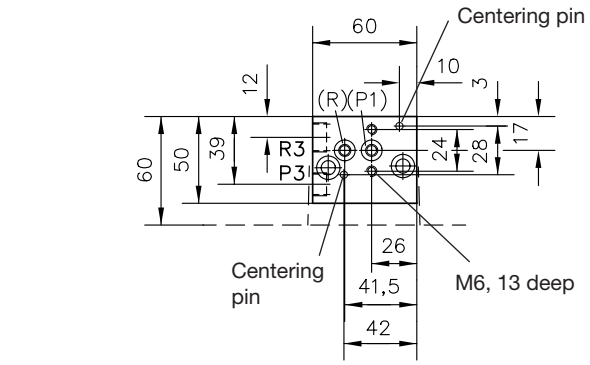
Type XS, XV

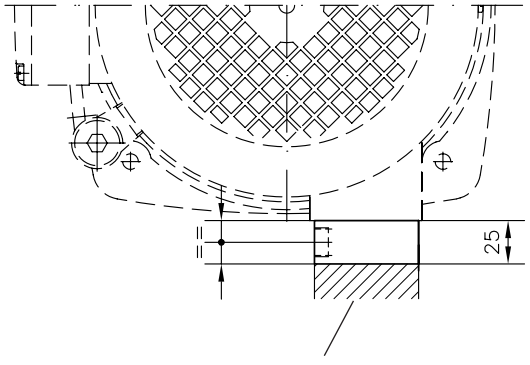


Type SX, VX



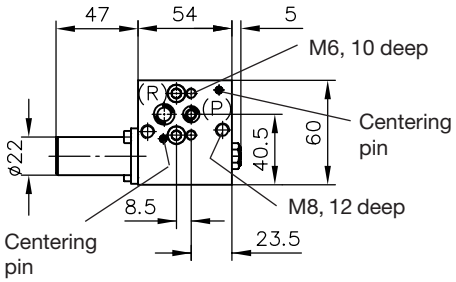
Type C 30

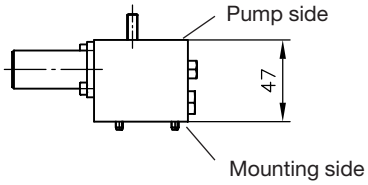




For specifications of the required ports at customer furnished manifolds, see type SS, VV ...

Type UNA



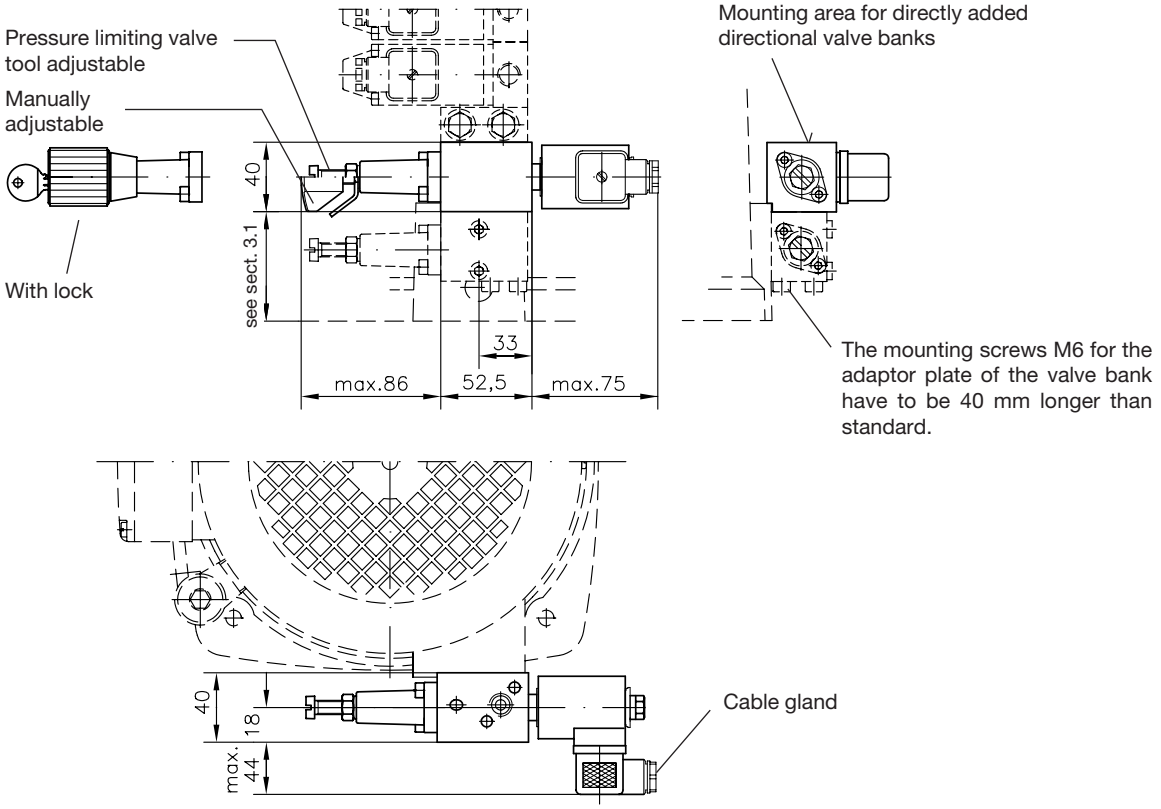


- For dimensions of threads M6, M8, and the centering pin, see type SS, VV ...
- Mounting screw 2x M6x55-8.8

Ports conf. ISO 228/1 (BSPP):
P3 = G 1/4
R3 = G 3/8
Mounting screws 2x M8x40-8.8

4.3 Additional intermediate blocks acc. to sect. 2.3

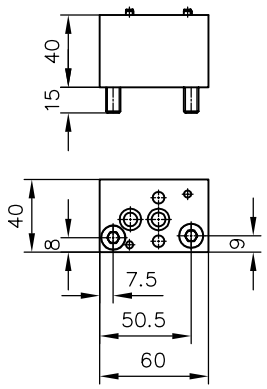
Type S1/... to S4/...
V1/... to V4/...



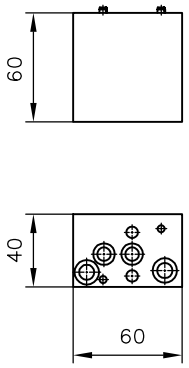
4.4 Spacer plate acc. to sect. 2.4

Type U, U1, U2, U3

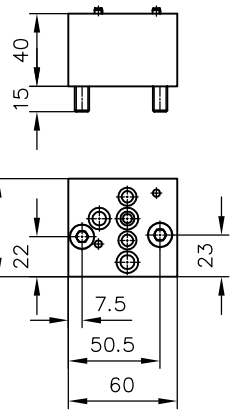
Type U



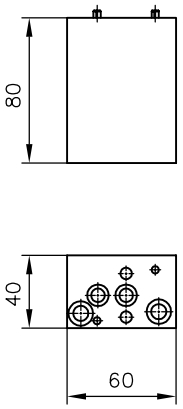
Type U1



Type U2



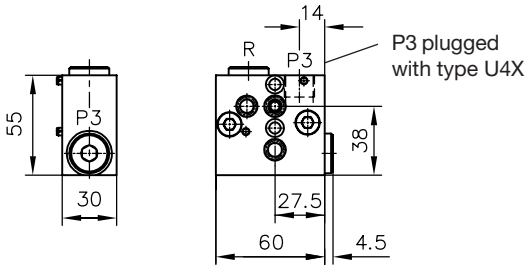
Type U3



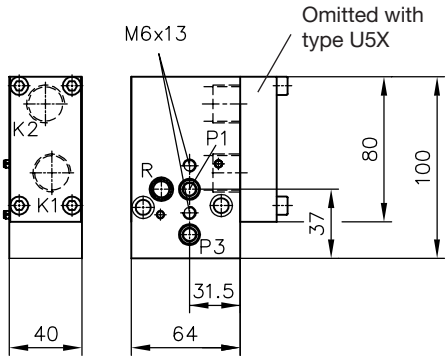
	Mounting screws	
	M6x..-8.8-A2K	M8x..-8.8-A2K
U	l + 40	45
U1	l + 60	l + 60
U2	l + 40	45
U3	l + 80	l + 80

l = length of the mounting screw scope of delivery with the connection block (see sect. 4.1 and 4.2)

Type U4, U4X



Type U5, U5X



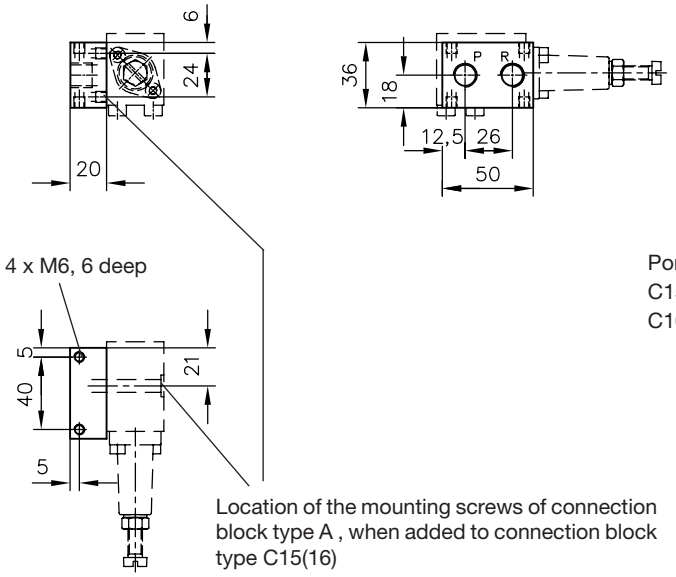
Ports conf. ISO 228/1 (BSPP):
K1, K2 = G 1/2
P3, R = G 3/8

	Mounting screws	
	M6x..-8.8-A2K	M8x..-8.8-A2K
U4, U4X	l + 30	30
U5, U5X	-	l + 40 (40)

l = length of the mounting screw scope of delivery with the connection block (see sect. 4.1 and 4.2)

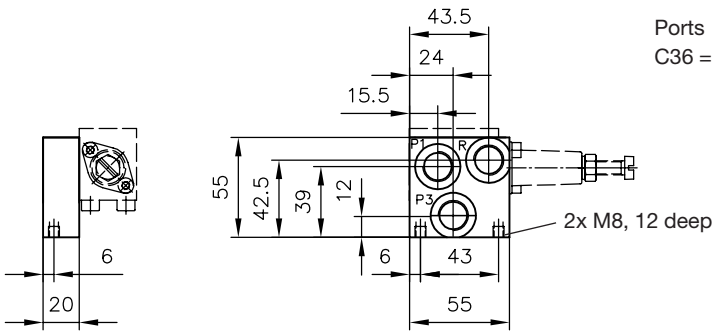
4.5 Connection blocks acc. to sect. 2.5

Type C15, C16



Ports P and R conf. ISO 228/1 (BSPP):
C15 = G 1/4
C16 = G 3/8

Type C36

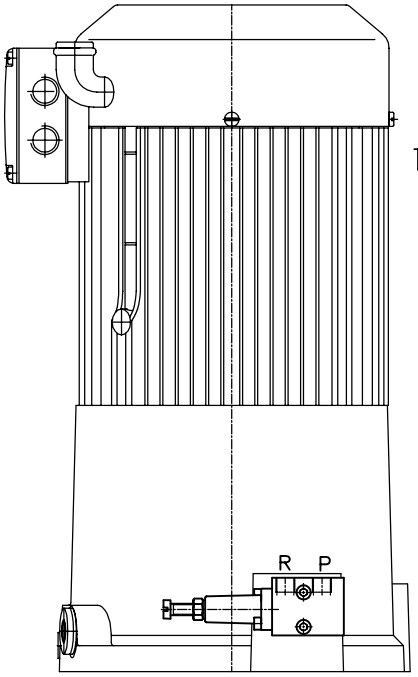


Ports P1, P3, and R conf. ISO 228/1 (BSPP):
C36 = G 3/8

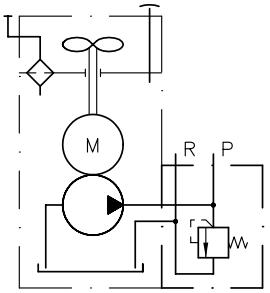
5. Example circuits

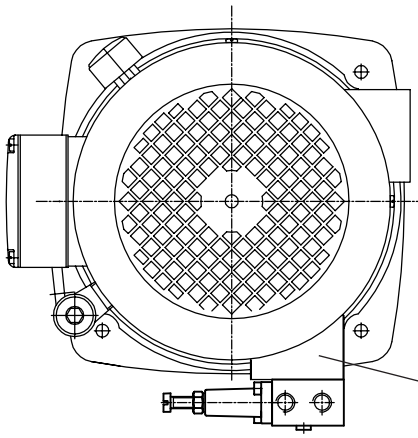
5.1 Single circuit pumps

Compact hydraulic power pack type HK
acc. to D 7600-4, D 7600-3, and D 7600-2



Directly mounted
connection block
Order example:
HK44/1-H8,3 **- A1/150**

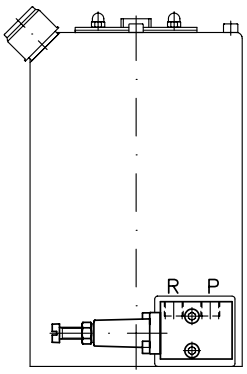




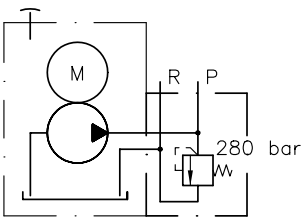
The second connection pedestal is unused here (only apparent with type HK4..)

Main connection pedestal

Compact hydraulic power pack type HC acc. to D 7900

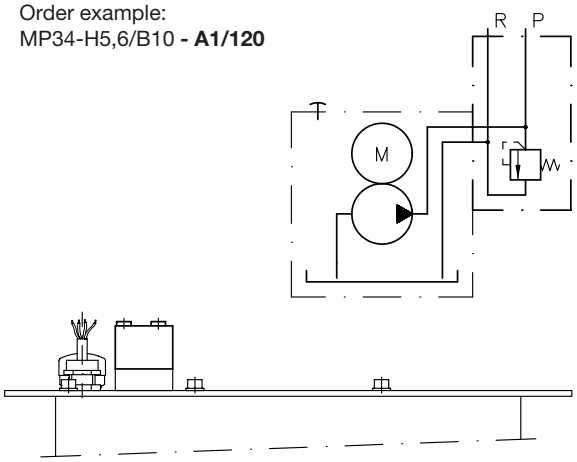


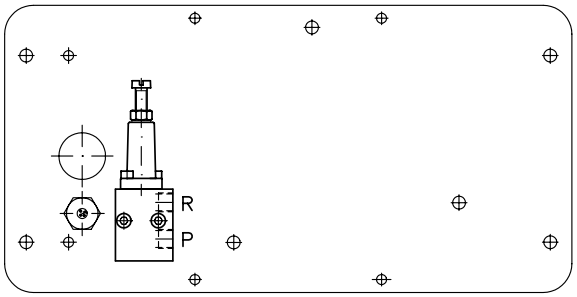
Directly mounted
connection block
Order example:
HC34/3,6 **- A1/280**



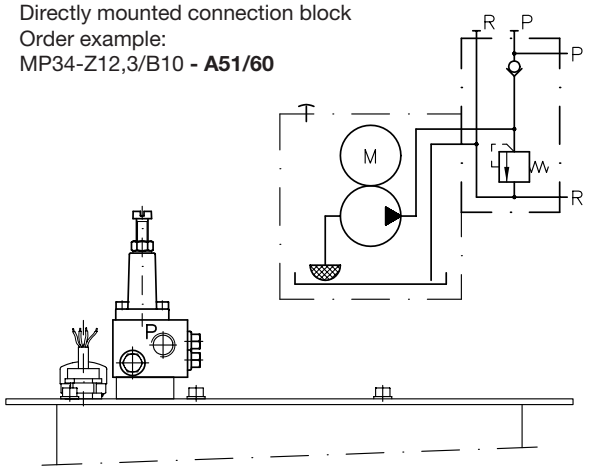
Compact hydraulic power pack
type MP acc. to D 7200 H

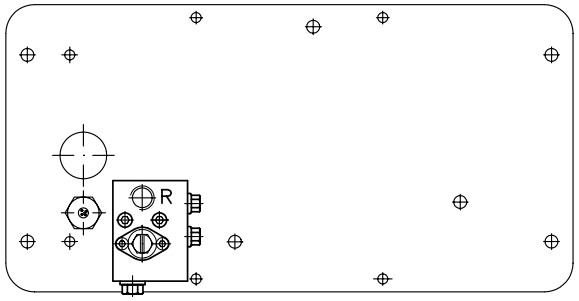
Directly mounted connection block
Order example:
MP34-H5,6/B10 **- A1/120**





Directly mounted connection block
Order example:
MP34-Z12,3/B10 **- A51/60**

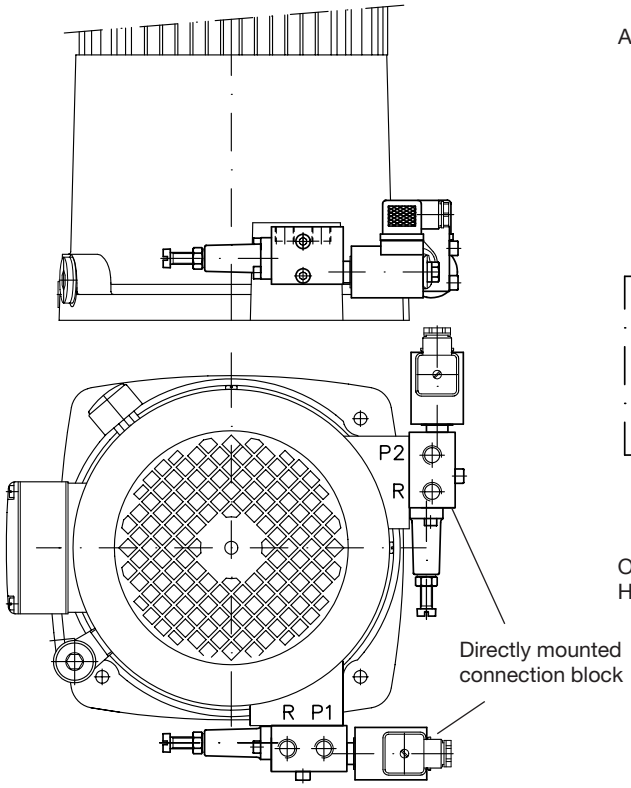




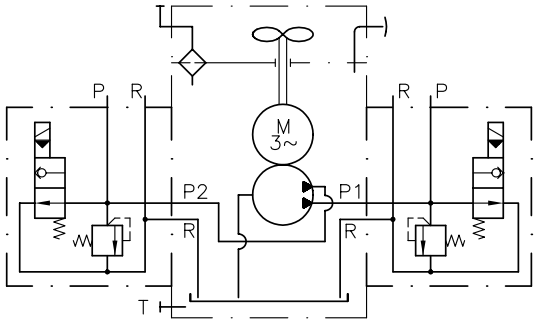
5.2 Dual circuit pumps

5.2.1 Pressure outlets P1 and P2 are located on two separate connection pedestals

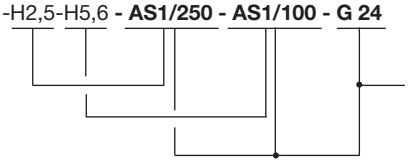
Example: Type HK4 acc. to D 7600-4



All connection blocks acc. to sect. 2.1 are suited.



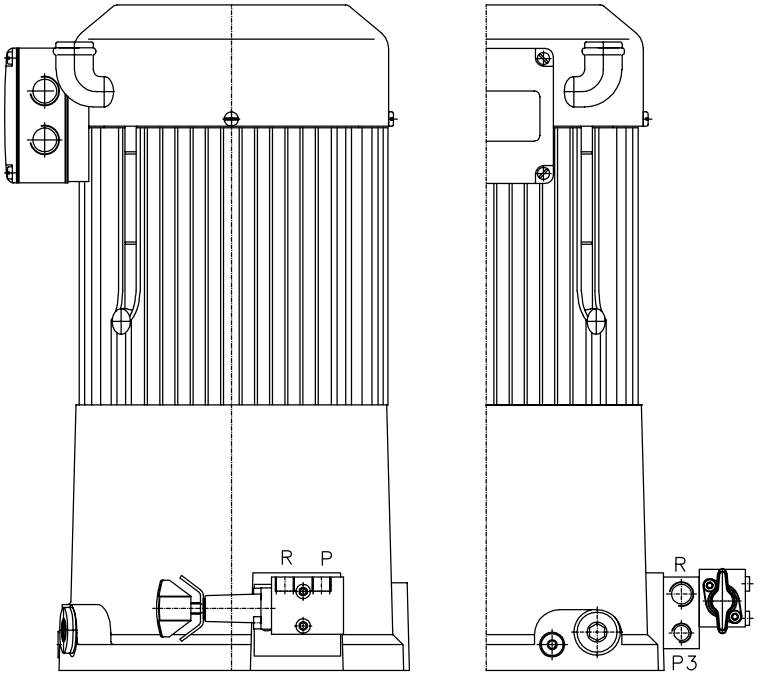
Order example:
HK44/1-H2,5-H5,6 **- AS1/250 - AS1/100 - G 24**



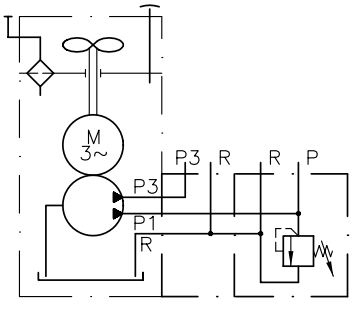
Observe
foot note [3])
in sect. 2.1.3!

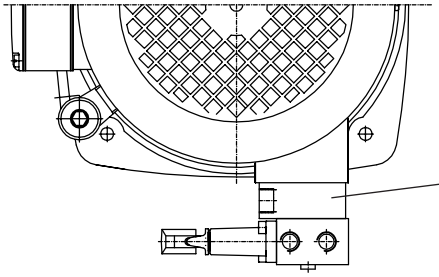
5.2.2 Pressure outlets P1 and P3 are both located at the main connection pedesta

Example: Type HK4 acc. to D 7600-4



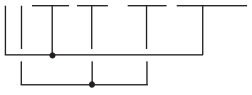
An additional intermediate block type C30 acc. to sect. 2.2.4 is required, when P1 and P3 are to be continued individually. All connection blocks acc. to sect. 2 can be directly mounted where P1 leaves the intermediate block, whereas pipe fittings have to be utilized for P 3 and the additional port R.
An intermediate block type SS, VV etc. acc. to sect. 2.2.4 enable joining of the delivery from ports P1 and P3 before this joint delivery is fed into the directly mounted connection blocks type A1/... to A43/...
(making type AS... or AV... superfluous).



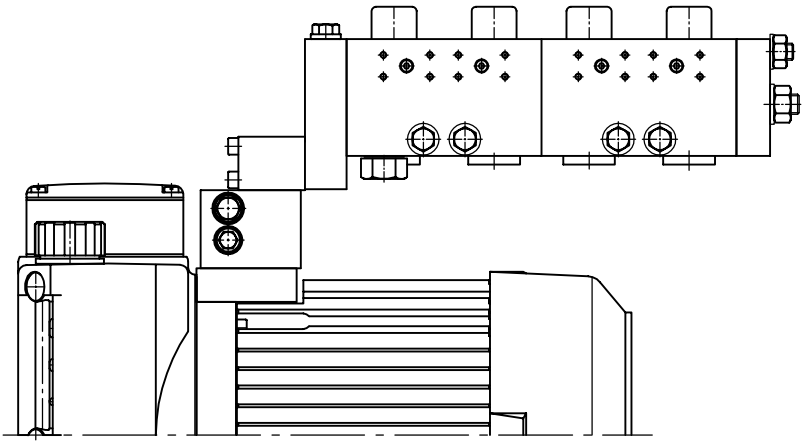


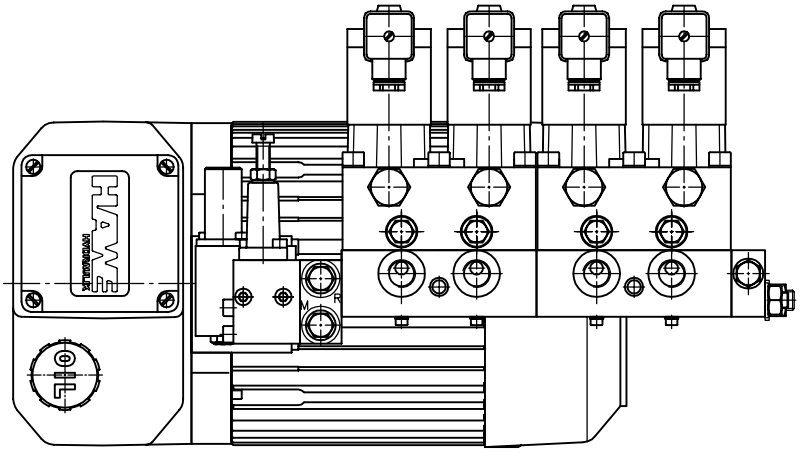
Intermediate block type C30 etc.
acc. to sect. 2.2.4

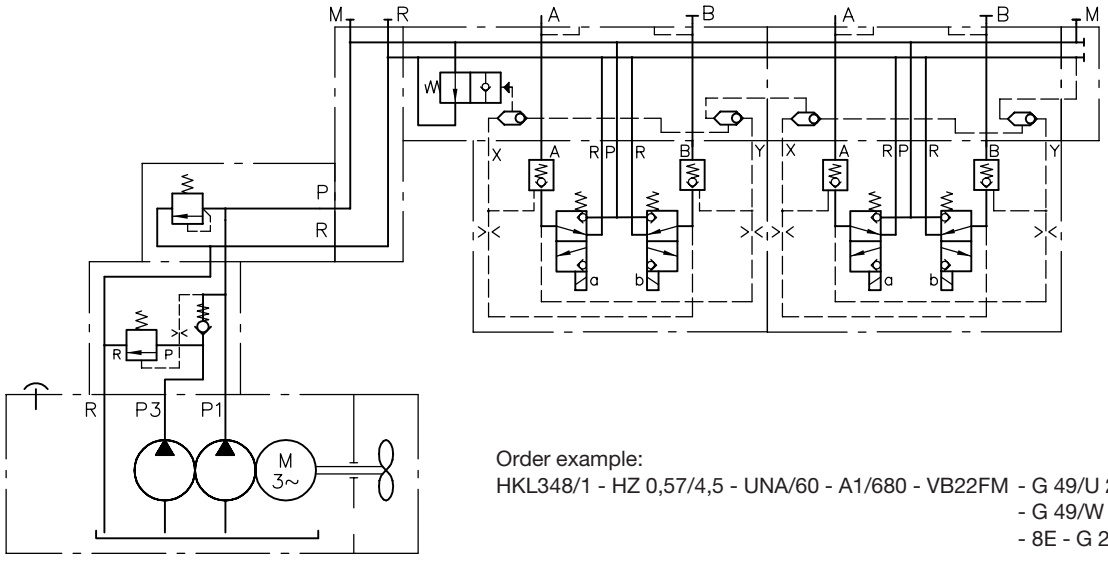
Order example:
HK44/1-HH1,25/5,6 **- C30-A2/700**



Example: Type HKL3 acc. to D 7600-3L



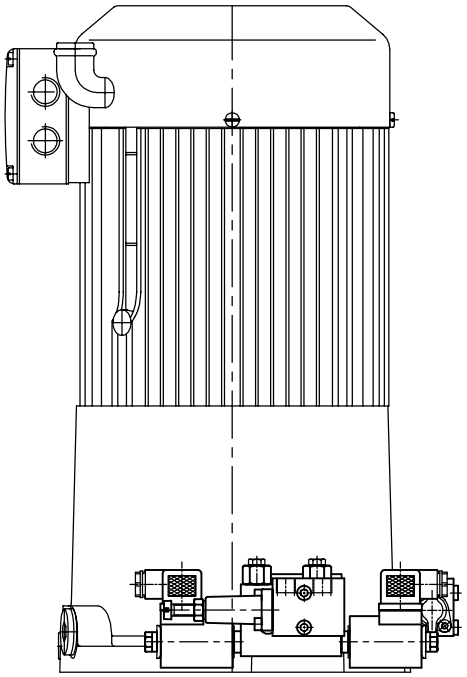


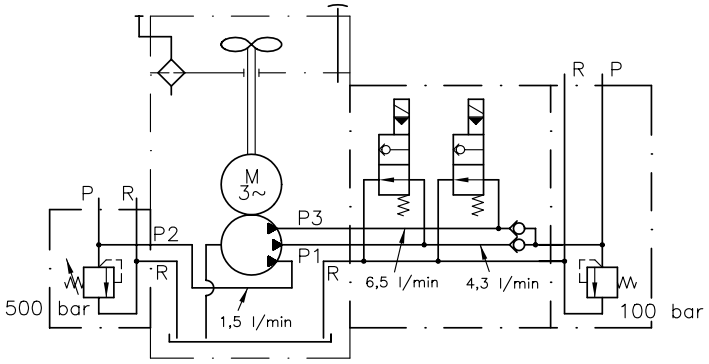


Order example:
HKL348/1 - HZ 0,57/4,5 - UNA/60 - A1/680 - VB22FM - G 49/U 22
- G 49/W 22
- 8E - G 24

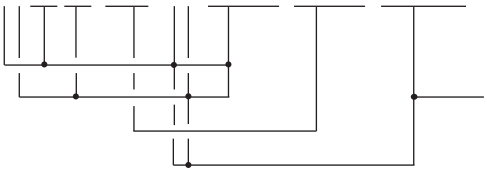
5.3 Triple circuit pumps type HK 4.. acc. to D 7600-4

Pressure outlets P1 and P3 are located at the main connection pedestal, whereas P2 is located at the second connection pedestal. An additional intermediate block type C30 acc. to sect. 2.2.4 is required, when P1 and P3 are to be continued individually. All connection blocks acc. to sect. 2 can be directly mounted where P1 leaves the intermediate block, whereas pipe fittings have to be utilized for P 3 and the additional port R.
An intermediate block type SS, VV etc. acc. to sect. 2.2.4 enable joining of the delivery from ports P1 and P3 before this joint delivery is fed into the directly mounted connection blocks type A1/... to A43/... (making type AS... or AV... superfluous).
All connection blocks acc. to sect. 2.1 are suited for P2 at the second connection pedestal.

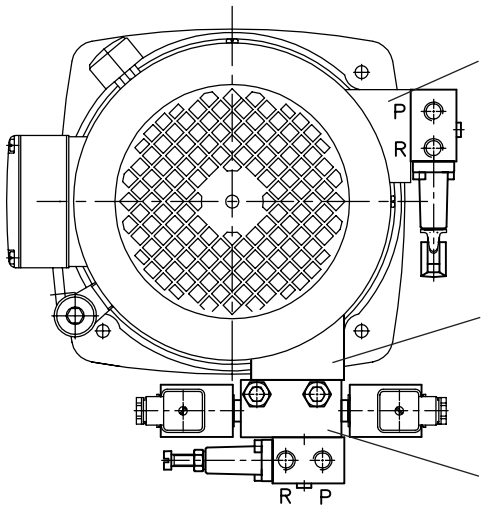




Order example:
HK44/1-HH4,3/6,5-H1,5 **- SS-A1/100 - A2/500 - WG 230**



Observe foot note [1] in sect. 2.2.4



Second connection pedestal

Main connection pedestal

Intermediate block type SS acc. to sect. 2.2.4